News of the Industry Begins Page 808

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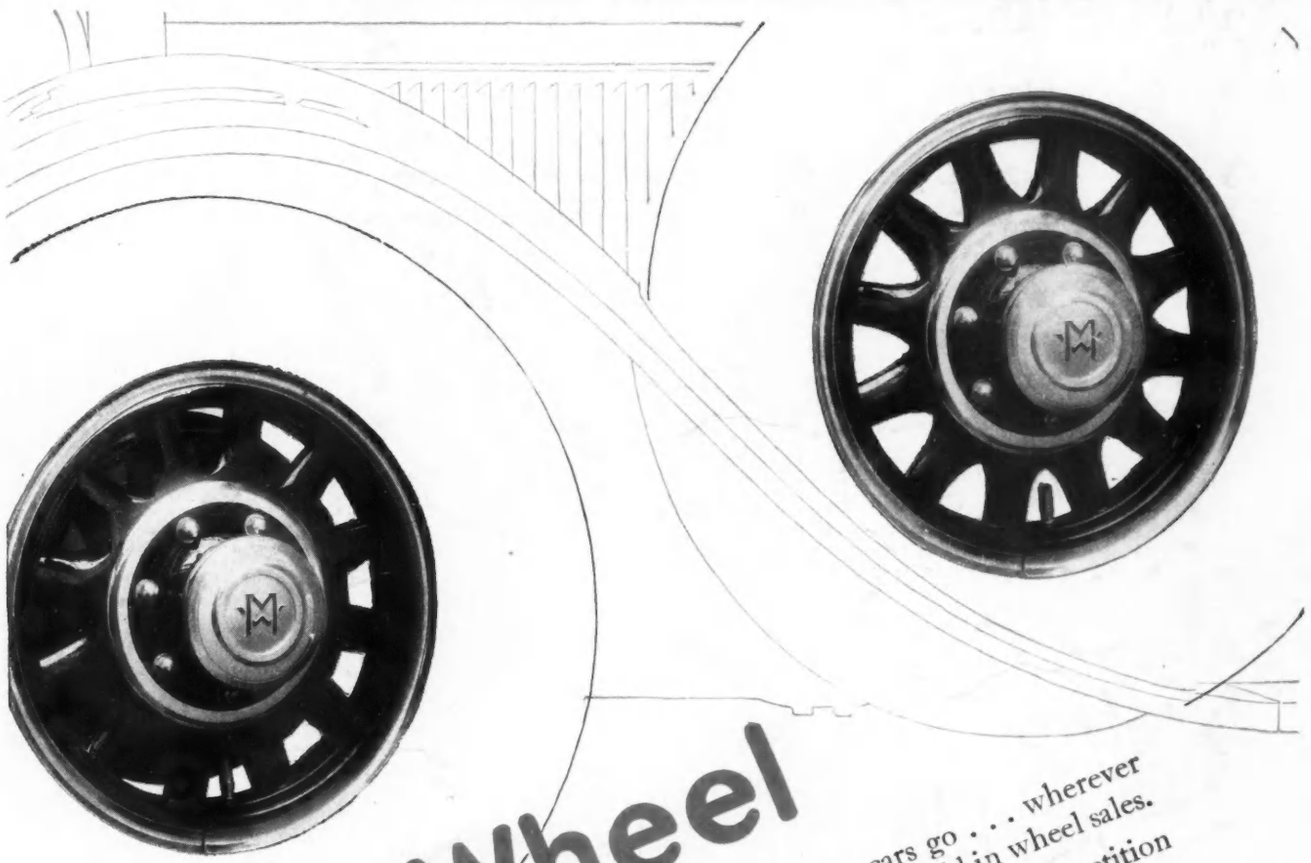

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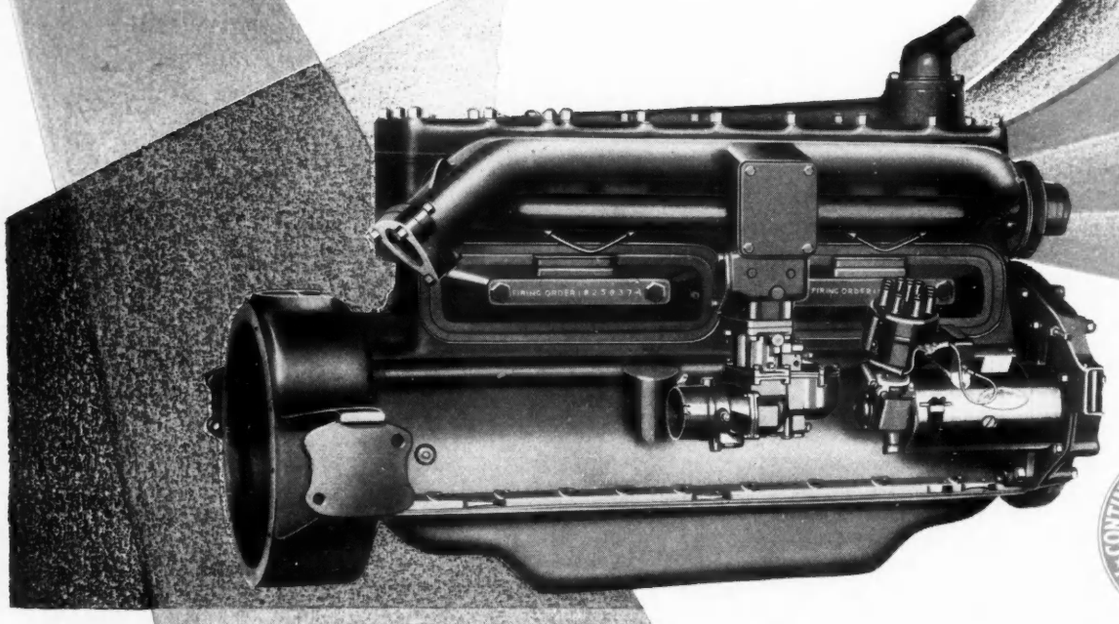

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Continental Motors

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THE AUTOMOBILE

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Established 1902

Vol. 61 No. 22

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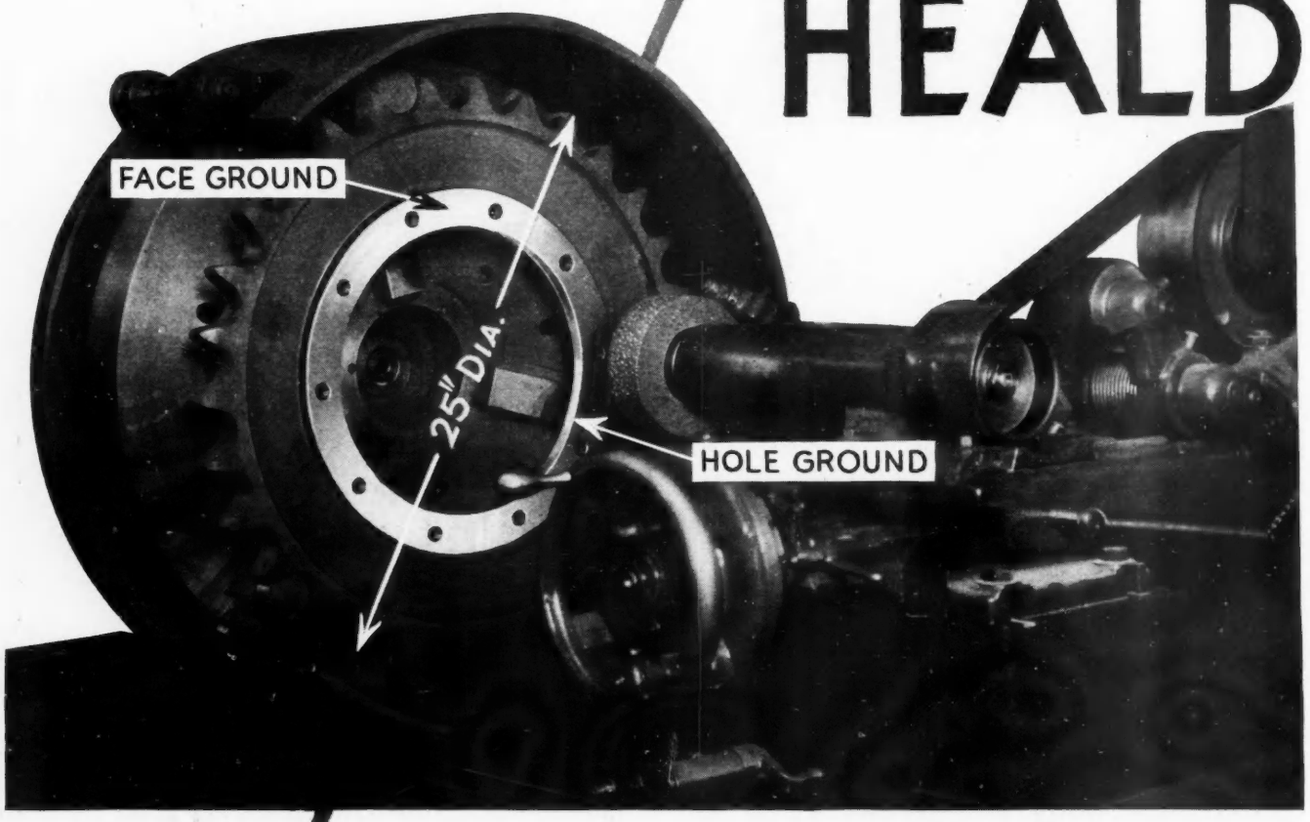

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AUTOMOTIVE INDUSTRIES
VOLUME 61 *Philadelphia, Saturday, November 30, 1929* NUMBER 22

Instalment Purchasing of Cars Should Stimulate *1930 Sales*

Time payment volume might be increased more readily if finance company paper were eligible for rediscount, contends National Association of Finance Companies in annual meeting.

By EARL O. EWAN

INSTALMENT selling, with the financing of automobile purchases on the time payment plan as its largest single item, will come to the rescue in the present business depression, Milan V. Ayres, of Chicago, economic analyst of the National Association of Finance Companies, asserted last week at the Sixth Annual Meeting and Financing Conference of the association, held in the Congress Hotel, Chicago. Many of those hit by the stock market, he explained, will now buy on instalments instead of paying cash.

The importance of this factor in the situation would be increased greatly, he said, if finance company paper could be rediscounted at the Federal Reserve Banks. His contention was expressed concisely in the title of his address, which was "Finance Company Paper Should Be Eligible for Rediscount at Federal Reserve Banks."

As a step toward organized effort to make such paper eligible, and thereby enable instalment financing houses to be of greater assistance in a business situation like the present, the association adopted a resolution on the subject. It "resolved that the Federal Reserve Act or the Regulations of the Federal Reserve Board should be amended so as to make eligible for rediscount the notes of banks and of financing or credit companies, the proceeds of which are to be used for financing the sale of merchandise in either wholesale or retail transactions."

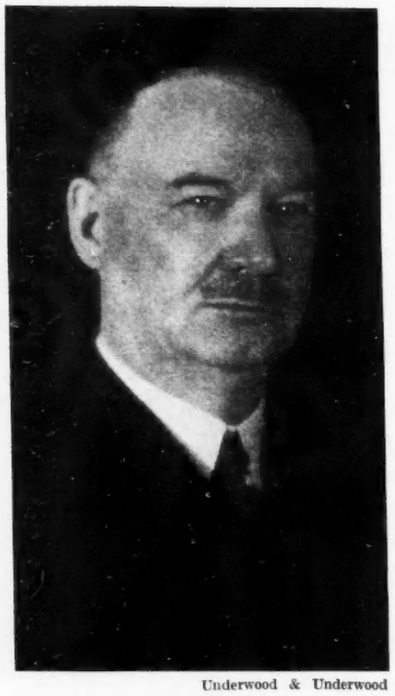
The resolution also "authorized, empowered and requested" the president of the association to appoint a special committee of five members to direct, in conjunction with the central office of the association, a program planned to bring about the proposed amendment to the Federal Reserve Act or the Regulations of the Federal Reserve Board. The committee has not been named.

Underwood & Underwood

Milan V. Ayres, of Chicago, economic analyst of the National Association of Finance Companies, who addressed the Sixth Annual Meeting and Financing Conference of that association last week on the subject, "Finance Company Paper Should Be Eligible for Rediscount at Federal Reserve Banks"

Present business conditions in the United States should not be interpreted as being alarming, it was the consensus of the 400 men engaged in financing instalment selling throughout the country, who attended the sessions, which were held Nov. 19 and 20. Most of them agreed that delinquencies in payments and repossessions of automobiles and other merchandise had been at the normal seasonal level. No unusual developments were anticipated outside of certain metropolitan areas, where it was expected that such slowing up as would occur would be of short duration and would be succeeded by a more normal and healthy condition.

"Manufacturers' inventories are generally low," said John J. Schumann, Jr., president of the General Motors Acceptance Corp., in commenting at the opening session upon business conditions. "Cash positions are correspondingly high. Money costs are rapidly declining. Merchants' stocks are generally low, due to hand-to-mouth buying, which has ensued for some time. Wages and employment scales are undisturbed. There is absolutely no fundamen-



Underwood & Underwood

C. C. Hanch, of Chicago, who was reelected secretary and manager of the National Association of Finance Companies at its annual meeting held in Chicago last week

tal reason for anything more serious than a very short pause in business to enable it to adjust itself to more normal credit conditions, unless from senseless fright we all talk ourselves into a more serious situation affecting the income and purchasing power of the public."

"It would not be surprising if there were temporarily some letting up in business," said Arthur W. Newton, vice-president of the First National Bank, Chicago, in addressing the conference, "but as I believe that on the whole conditions are intrinsically sound, I do not expect that the decline, if any, will be great or of long duration, and if there should be a slowing down in volume, I should look for it to be succeeded by a large volume of business, with the accompanying prosperity to which we have for so long been accustomed."

Mr. Newton also expressed the belief that "When we do run into easy money, which we should do soon, the finance companies will no doubt experience some of the benefits of the continually increased regard in which they are held." He, as well as others, pointed out that if finance company paper were made eligible for rediscount at the Federal Reserve Banks, it would make it easier for those concerns to obtain additional lines of credit at banks and to extend lines of credit they already have, since their paper would be more readily convertible—a quality which bankers deem highly desirable. Lower money rates might be obtained by finance companies if their paper were made eligible, it also was indicated, which would be of considerable benefit to the companies even if the reduction were not large enough to be passed on to the individual instalment buyer to an appreciable extent. Bank rates to finance companies have been about 1 per cent higher than rates to commercial borrowers. It is believed that eligibility of finance company paper ultimately although not immediately would remove this disparity.

Instalment Sales Experience

An analysis made by the association of the composite experience of a large number of finance companies and automobile dealers in the selling of passenger cars and commercial vehicles on the instalment plan was presented in tabular form to those who attended the meeting. The table is printed in full on page 801 in this issue. In the passenger car field, a comparison for the first nine months of 1925, 1926, 1927, 1928 and 1929 showed that: the average direct loss per repossessed car has increased in most instances since 1926, the losses have grown this year on accounts based on terms more lenient than those prescribed as standard, and the percentages of repossessions of both new and used cars have been about the same for the last two years. The comparison likewise shows that repossessions where terms have been more lenient than the standard requires have been greater in the category of new cars and less in that of used cars within the last two years, the average amount of the note purchased has been smaller for both new and used cars in the first nine months of this year, the percentage of new and used cars sold on the instalment plan has increased this year, the percentage of trade-ins has increased over last year, the number of skips per 1000 transactions has increased this year, instalment paper ratios show that retail paper with more than 12 monthly payments as well as that with less than standard down-payments has increased since 1927, and that the percentage of new car paper to the total purchased has decreased since 1927 while that of used car paper to the aggregate has grown since 1927.

It also is shown in this connection that the number of new cars in proportion to the total number financed has decreased since 1927, and that the aggregate of used cars as compared with the total number financed has increased since 1927.

In the commercial car field, comparisons are given for the first nine months of 1927, 1928 and 1929. They show that: the average direct loss per repossessed car has been growing since 1927; losses on terms more lenient than standard have increased; the percentage of repossessions has increased this year in the used car category but decreased in the case of new cars where the down-payment has been 33.3 per cent of the total cost; the average amount of the notes purchased has increased in the case of new cars but decreased this year in the instance of used cars; the percentage of new cars sold on instalments has decreased while that of used cars has increased and the percentage of the total of both has declined, the percentage of trade-ins on both new and used cars has increased, and the number of skips per 1000 transactions has grown.

Nathan B. Williams, of Washington, D. C., an attorney, who addressed the conference on "Losing Cars Legally." He urged the association to fight for interpretation by the courts of the complicated and chaotic laws under which automobiles now are being seized in the enforcement of prohibition

Having reviewed briefly these facts, we may resume the consideration of Mr. Ayres' contention that finance

company paper should be eligible for rediscount at the Federal Reserve Banks. Mr. Ayres summarized his reasons for taking that stand as follows:

"There is a growing deficiency in the total existing volume of eligible paper, which now apparently amounts to not less than two and eight-tenths billions of dollars.

"The banks desire more eligible paper, and frequently refuse to loan to finance companies because their paper is not eligible.

"They want eligible paper because it constitutes a sort of secondary reserve, which may become a very valuable resource in case of emergency.

"The notes of finance companies constitute a particularly safe kind of paper, which banks would be glad to have if it carried this quality of eligibility.

"The purpose for which such notes are made is unquestionably within the class of purposes which the framers of the Federal Reserve Act intended to cover within the definition of eligibility, but by a narrow interpretation of that definition the board has excluded it."

Eligibility of finance company paper was denied, Mr. Ayres said, by one of the early rulings of the board, made in 1918, which reads:

"The note of a finance or credit company, which is drawn either directly or indirectly to finance some industrial or commercial concern in the transaction of its business, is not eligible for rediscount, even though it may be secured by paper which is itself eligible for rediscount."

The basis for this ruling, as given by Mr. Ayres, is set forth in the regulations, two paragraphs of which read as follows:

"(a) It must be a negotiable note, draft, or bill of exchange which has been issued or drawn, or the proceeds of which have been used or are to be used IN THE FIRST INSTANCE, in producing, purchasing, carrying, or marketing goods in one or more of the steps of the process of production, manufacture, or distribution, or for the purpose of carrying or trading in bonds or notes of the United States, and the name of a party to such transaction must appear upon it as maker, drawer, acceptor, or indorser.

"(b) It must not be a note, draft, or bill of exchange the proceeds of which have been or are to be advanced or loaned to some other borrower."

Underwood & Underwood

Victor L. Brown, who was elected president of the National Association of Finance Companies at its annual meeting last week. He addressed the opening session of the conference on the topic, "Operating a Successful Independent Finance Company." Mr. Brown is president of the Motors Acceptance Co., Milwaukee

"The First Instance Doctrine"

These two paragraphs state what has been called "The First Instance Doctrine." It has been adhered to by the board for many years, but was set aside by Congress in 1923 insofar as two classes of agricultural paper were concerned through an amendment of the Federal Reserve Act. This amendment made eligible both agricultural factors' paper and paper drawn by cooperative marketing associations, the proceeds of which are to be advanced by the association to members thereof for agricultural purposes or are to be used by the association for buying farm products or preparing them for market, Mr. Ayres told the delegates.

A similar amendment enacted to the act by Congress would extend eligibility to finance company paper, Mr. Ayres said, but an easier and quicker way would be for the Federal Reserve Board to amend its regulations. It is in the regulations, rather than in the act, Mr. Ayres maintained, that the restriction excluding finance company paper is found.

Economic Need of Change

Necessity for taking one of those steps has resulted, according to Mr. Ayres, from the many important changes in our economic life, including those that have followed the World War, that have occurred in the 16 years that have elapsed since the Federal Reserve Act was enacted in December, 1913. One of the changes is reflected, he said, in the objection which bankers so often make to finance companies—that their paper is not eligible for rediscount at the Federal Reserve Banks. Mr. Ayres said the objection had grown out of a condition which was well set forth in an excerpt from an address delivered by Dr. W. Randolph Burgess, Assistant Federal Reserve Agent of the Federal Reserve Bank of New York, before the Federal Acceptance Council on Dec. 11, 1928. Dr. Burgess said:

"Since 1920, the amounts of eligible paper held by national banks have diminished from four and a half billion dollars to less than three and a half billion dollars, or from about 25 per cent of total loans and investments to about 15 per cent, and the tendency is continuing. This is due undoubtedly to changes in methods of business finance. Urged on by bankers, many business concerns have liquidated their bank loans by selling securities. How far this tendency will go, no one can say. It depends in part upon money market conditions, but it is favored by current low yields on securities, by the profit bankers make in these financing operations, and by the freedom from obligations to banks which it gives business men. In its definition of the eligibility of paper for rediscount, the Federal Reserve Act hardly contemplated this change in American financing methods. Carried to an extreme, these changes may make necessary some modification of the Reserve Act."

A number of other men in the financial field were cited by Mr. Ayres as having called attention to the progressive decrease in the volume of eligible paper, and as having pointed out the necessity for changing the law or the regulations to bring about an increase. E. H. H. Simmons, president of the New York Stock Exchange, was credited with having advocated publicly that notes of brokers, the proceeds of which are used to buy securities which they hold for their clients, should be made eligible. Samuel P. Arnot, president of the Chicago Board of Trade, was said to have recommended an amendment to the Federal Reserve Act to make all legitimate collateral, including stock certifi-

(Continued on page 800)

Automotive Industries
November 30, 1929

Exhaust-Turbo Supercharger Was Outstanding Topic at

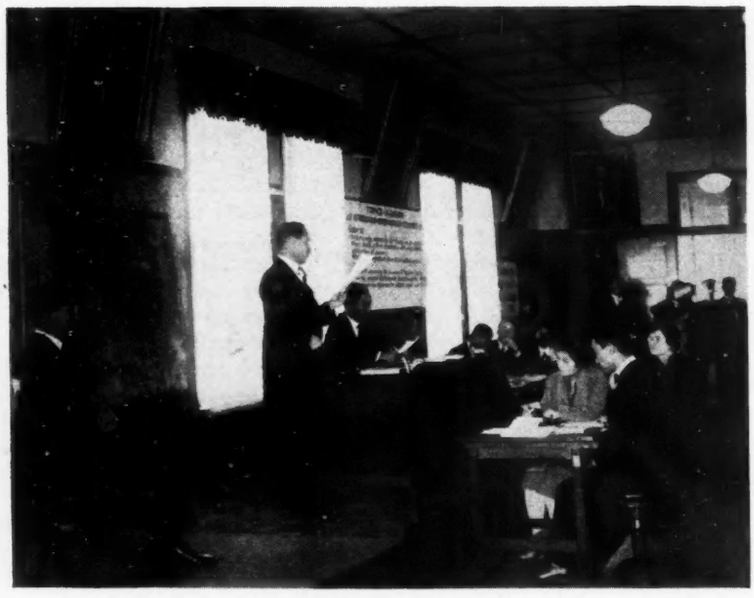
Increases in output of 50 to 100 per cent Diserens, Osaka representative of reported his findings in a

By BURTON

PROCEEDINGS in the motor vehicle section of the Tokyo Sectional Meeting of the World Power Conference, which came to an end Nov. 7, contained little of comfort for the manufacturer of gasoline motor cars. The two papers discussed dealt exclusively with electric vehicles run on storage batteries and the first endeavored to demonstrate their superiority over those powered by internal combustion engines.

Other sections of the Conference and of the World Engineering Congress, which held a simultaneous session, however, brought contributions which may (or may not) have some bearing upon the future development of the automotive industry. Perhaps the most important of these was a paper by Charles Diserens of Osaka, representative in Japan of the Swiss Locomotive and Machine Works and the Brown-Boveri Company. Mr. Diserens gave an exceedingly careful exposition of exhaust-turbo-supercharging of Diesel engines along the lines developed by A. Buechi. He told of experiments which show an increase in output of 50 to 100 per cent. Delegates to the Congress hailed this as the most significant paper submitted in the field of power. A highly theoretical paper on exhaust-turbo-supercharging, also mentioning the Buechi system, was submitted to the Conference by Dr. G. Hamabe of Japan. It did not, however, contain the wealth of experimental material provided by Mr. Diserens.

THE accompany written espe tive Industries by attended the Con



Prince Chichibu of Japan attending one of the section meetings of the World Engineering Congress

Nine other papers on automotive engineering and related lines were submitted to the World Engineering Congress. These will be discussed individually.

The more significant of the two papers on the electric vehicle came from the pen of Dr. K. Fukuda, a Japanese connected with the Yuasa Storage Battery Company, a subsidiary of the vast Mitsui interests. His paper was a studious examination of everything which has been done in the use of electric buses in Germany, compared with results obtained by test machines operating between Kyoto and Osaka, in Japan. He emphasized the fact that his recommendations are meant to apply to buses, traveling over known territory, under known conditions, always within reach of their bases for service and battery recharging.

German practice, he developed, shows that the electric bus will effect a saving in total expenses of 25 per cent or more when compared with the gasoline bus. Figures from three German cities are based on a charge of 0.10 mark per kilowatt-hour, with gasoline costing 0.40 mark per kilogram. The buses on which the tests were made ran over the same routes, averaging the same distance per day and operating continuously for 300 days apiece in city traffic.

For Japan, said Dr. Fukuda, the advantages of the electric vehicle are even more apparent than they are in Germany, as Japan has abundant hydro-electric power. The cost per kilowatt-hour in Japan is just one-fifth of that in Germany. His own tests, over an unpaved prefectural road, demonstrated, he said, that the electric was more economical than the gasoline bus. When paved roads are available for such buses, he de-

System for Diesel Engines World Engineering Congress

were indicated by tests made by Charles the Brown-Boveri Company, who paper read at Tokyo meeting.

CRANE

ing article was cially for Automo- Mr. Crane, who gress in Tokyo.

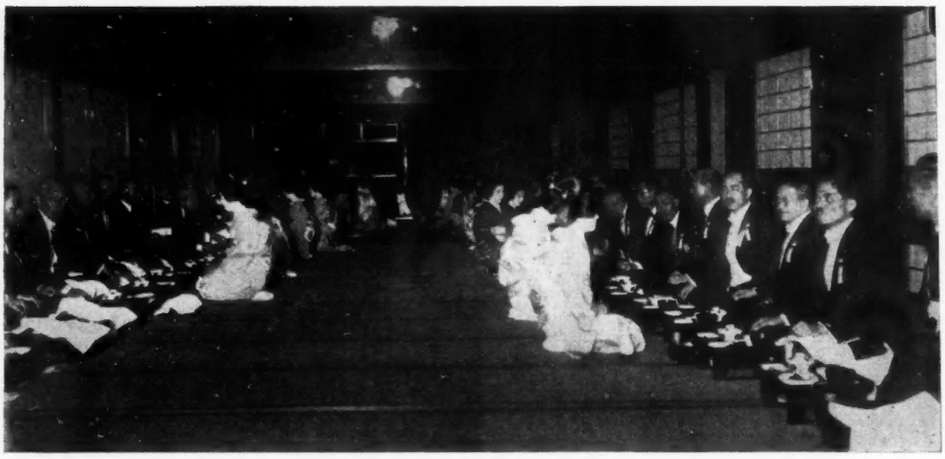
clared the advantage of the electric will be overpowering.

The second paper on this subject was by M. Mille, of France, and was submitted in French. It dealt with the use of storage battery locomotives on coal mine railways, offering them as substitutes for compressed air locomotives. The effective capacity of the former, he said, was about 50 kw.h. and the power consumption between 55 and 60 kw.h. per ton-kilometer when running on a 5 per cent grade.

The paper by Mr. Diserens described a Diesel engine which is exceptionally easy to start and which runs cooler when supercharged than when not. One of its most interesting points appears to be the fact that supercharging is possible on small Diesel engines and apparently operates quite as efficiently on them as on engines of 500 b.hp. and more. The Buechi system is a combination of a supercharged Diesel engine (producing at full useful output) and of an exhaust gas turbine serving only to drive the supercharging blower. Engine and turbine are independent, connected only by the exhaust gas and air piping. At present supercharging pressures it has been found unnecessary to cool the charging air after it has passed through the blower. This supercharging system is combined with the scavenging of the cylinder interior. Owing to the drop in pressure at the end of the expansion stroke, the cylinders are cleared of exhaust gases to a very high degree. The whole compression space is then filled with clean, relatively cold air. When the piston is in the top position and the combustion chamber a flat space, a large quantity of scavenging air (two or more times the volume of the compression space) is blown into the cylinders. Thus the inner walls are cooled, all the exhaust gases are cleared out, and much more and cooler fresh charge is taken in than ordinary Diesel engines. The pressure in the exhaust pipe reaches a minimum at a time when the piston is moving very slowly, and therefore there is time for introducing the scavenging air. Naturally a large excess of combustion air is available at all loads.

One advantage pointed out is the possibility of maintaining a large excess of air within wide limits. The exhaust-gas turbine operates at variable speeds, depending upon the load conditions of the engine, and the author asserted that tests made show that this self-contained unit is by far more economical than any other means of operating the supercharging blower.

As Honorary President of the World Engineering Congress, Prince Chichibu, Heir Presumptive to the Imperial Japanese Throne, opened the sessions on Oct. 29. Prime Minister Hamaguchi is nearest to him, at his left. Almost immediately behind him, with his hands clasped behind his back, is Dr. Elmer A. Sperry, head of the American delegation. The picture was taken in the Municipal Auditorium, Tokyo



The Japanese hosts relax from the strain of the World Engineering Congress at a geisha party

The temperature of the turbo-charged engine is far lower than that of the ordinary four-cycle Diesel engine, the difference being as high as 194 deg. Fahr.

According to tests mentioned by Mr. Diserens a Diesel engine with a normal unsupercharged rating of 500 b.hp. was loaded up by exhaust-turbo supercharging to 1020 b.hp., which corresponded to a mean effective pressure of 10.8 kg/cm² (152.5 lb. per sq. in.). Its normal continuous rating when supercharged is 750 b.hp., or a mean effective pressure of 7.95 kg/cm² (112 lb. per sq. in.). This machine was not designed for supercharging.

Another test, said Mr. Diserens, demonstrated the fallacy of the idea that only large engines could be so supercharged. There is now, he said, a small four-cycle, four-cylinder airless fuel injection engine, with cylinder bore 370 mm. and stroke 520 mm., which had a normal unsupercharged rating of 330 b.hp. at 275 r.p.m. Actual results show that it can easily develop 600 b.hp. and at full load has a fuel consumption of but 161.5 gr./b.hp. hour. Incidentally, fuel consumption figures vary but little as the load falls, the highest being 166 gr./b.hp. hour for a range of between 60 and 120 per cent of rated output. So far, no attempt has been made to develop a unit smaller than the 330-600 b.hp. engine mentioned. Marked increase in efficiency over older Diesel types, however, opens up the possibility that Diesels may enter the automobile field.

The paper by Dr. Hamabe, who was assisted by Dr. Tokiwa Sasaki, was entitled "The Effect of the Exhaust Gas Turbine Applied to the Diesel Engine for Supercharging." It consists of 59 pages of formulas. Their conclusions are as follows:

1. Owing to the higher back pressure of the exhaust stroke, engine efficiency falls if supercharging is carried to too high a degree.

2. Supercharging systems in which the engine is exhausted under atmospheric pressure give more efficiency to the engine but do not permit of such high degrees of supercharging.

3. At a moderate degree of supercharging (providing elevation of the compression pressure by supercharging is admissible) they find that supercharging with atmospheric back pressure and with non-reduced compression ratio leads to the highest efficiency.

They remark in closing that "these investigations concerning Diesel engine plants have been worked out only theoretically."

B. B. Bachman, of the Autocar Company of Ardmore, Pa., submitted a paper on "Factors Governing the Use and Construction of Motor Trucks." He asserted distinctions should be made between the design of a vehicle meant primarily for retail delivery and between one intended to operate over a radius of from 50 to 200 miles. He predicted that the future developments of the motor truck will be along the lines of greater simplicity and ease of operation, with greater comfort for the operator.

Walter de la Roche Bond and A. Healey of the Dunlop Rubber Company presented a paper on the "Pneumatic Tire in Heavy Transport." It dealt with the reasons for the change of public favor from solid to pneumatic tires and then went on to tell of the efficiency of the giant pneumatic and to sound out the possibilities of future development toward a larger and softer tire.

The "British Light Car," a paper by A. H. Wilde of the Standard Motor Company, was largely matter descriptive of the type of light car which has been developed in Great Britain. The data included can be found in the current catalogs of the Austin, Standard and Morris-Cowley companies.

Unfortunately, the paper by Mr. Kichihei Miki, a Japanese military engineer, has not been printed in full. It dealt with experimental research on the utilization of alcohol and charcoal producer gas for ordinary gasoline automobile engines. The abstract only is available at this writing. I tried to hear the reading of the paper but the author's English broke down and he

A ball for delegates was given in the Imperial Hotel, Tokyo

finished in Japanese. My Japanese, while useful enough for ordinary purposes, does not extend to technical subjects. Mr. Miki's researches undoubtedly were prompted by the fact that Japan has a wholly inadequate peacetime petroleum supply, being forced to import two-thirds of its requirements. Substitute motor fuels therefore must be found.

"Some Points of Interest in Connection With the American Motor Coach Industry" was the title of a most interesting paper by G. A. Green, vice-president in charge of engineering of the General Motors Truck Corporation. Mr. Green indicated that considerable study is being devoted to the use of fuels less volatile than gasoline. Motor coaches, he said, are tending to become heavier and more costly to operate, due to the public's insistence upon safety, comfort, appearance, speed and acceleration. Taxes also are mounting. Heavier coaches mean greater fuel consumption, and since fuel is an exceedingly large factor in figuring the expense of operation (with gasoline taxes included), efforts are being made to use heavier fuels. Mr. Green undertakes a detailed study of the fuel situation in the United States, giving figures on taxes, costs and refining operations and calculating the potential savings from the use of less volatile fuels.

Austin M. Wolf, an American automotive consulting engineer, sent in a paper on the design of American passenger automobiles, particularly as related to domestic and foreign markets. This was a careful analysis of the principal improvements in efficiency, comfort and appearance which have been introduced in the past two or three years. The paper included the statement that such factors have proved of equal importance in foreign and domestic markets.

Dr. Kazuo Kumabe, an assistant professor at Tokyo Imperial University, has invented a device for measuring the tractive force of an automotive vehicle. Two rolling drums, each about 55 in. in diameter, are mounted on a shaft over a pit, with friction brakes used for the absorption of power. A traction dynamometer designed by Dr. Kumabe is provided. This transmits the tractive force to a measuring spring by a bell crank and the force is measured by the elongation of the spring, which is proportional to the angle of rotation of the center spindle of the crank. A weight is hung from the center of the center spindle of the crank and immersed in an oil bath. The angular position of the wire supporting the weight, which is proportional to the elongation of the measuring spring, is indicated by an optical lever. Small variations are thus damped out.

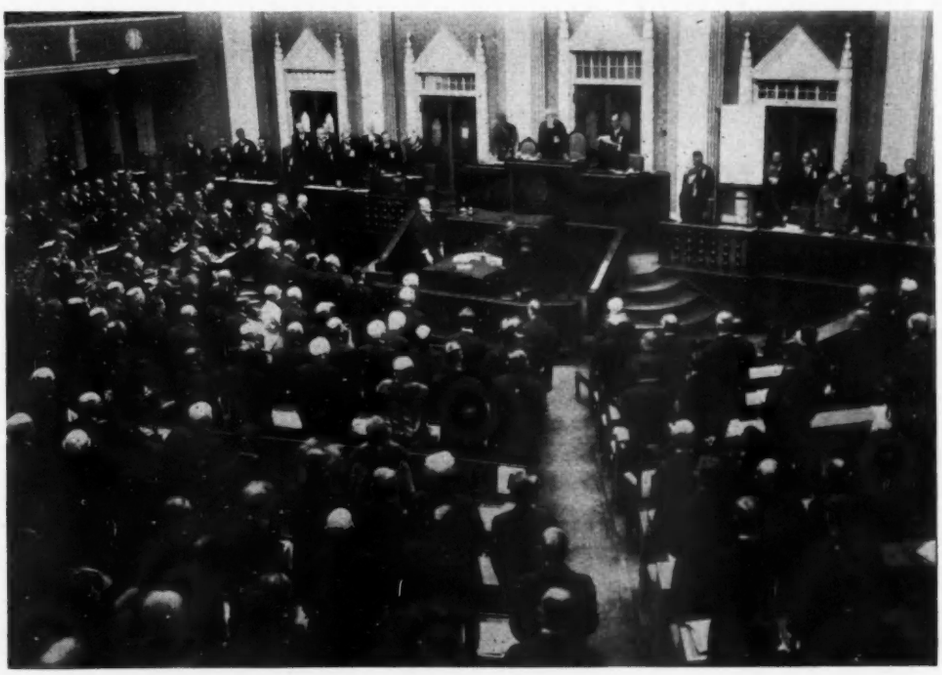
The author gave the result of a performance test on a Citroen car. He found the rolling resistance to be 20.3 kg. per 1000 kg. of car weight. Serious tire slip occurred under heavy loads, increasing as the tractive force increased. The relation is represented by $S = 0.228F^{0.69}$ where S equals per cent of slip and F represents the tractive force as observed by the traction dynamometer. The volumetric efficiency, and hence the power of the engine, was found to decrease as the jacket temperature rose and no optimum temperature was found. Fuel economy is practically not affected by the jacket temperature. The most economical speed for the Citroen car under test was found to be 18.5 m.p.h.

The papers summarized above were the only ones presented at Conference or Congress which dealt with automotive engineering proper. There was some study of regenerating used mineral oils, of internal combustion engines for fast line cars on narrow gage tracks in Italy, and of aviation. In the last field there were two papers on engines. One of these, by A. R. Fedden, chief engineer of the British firm of Brazil-Straker, was a careful study of in-line air-cooled engines.

Crowded Program

Speaking broadly of the World Engineering Congress, it may be said that the Japanese hosts were perhaps a trifle too ambitious. There was too patent a desire to have the largest engineering gathering the world had ever known. To further this end, practically every paper submitted was accepted and more than 800 in all were placed upon the agenda. Some two-and-a-half-hour sessions handled as many as 16 papers, reading them all in full or in extract. Comparatively few of the papers were printed in full, so that discussion was either limited or impossible on those for which only the abstracts were available. In many sections, as a matter of fact, the programs were so crowded that the chairmen were forced to eliminate discussions. Engineers from several countries were heard to express the opinion that the session would have been more satisfactory from a technical point of view if about two-thirds of the papers had been rejected.

It is to be doubted, however, that any delegate attending is sorry he took the journey to Japan. Contacts with eminent authorities from other countries and a long succession of beautifully-organized social events more than made up for minor annoyances arising from the serious side of the program.



Baron Koi Furuichi, president of the World Engineering Congress, making his address at the closing ceremonies on Nov. 7 in the Imperial Diet Building.

Continental Motors' New Plant From Each Side by *Self-*

Realignment of machinery, fixtures, just completed, in production

By JOSEPH

MAKING 21 distinct engine models to the specifications of 78 different customers presents a truly complex problem in manufacture and planning, particularly when it is considered that this work is done under one roof, over one assembly line and with a degree of flexibility that permits of daily changes in schedules. Abandoning traditional methods, the Continental Motors Corp. has just completed a realignment of its entire plant—machinery, partitions, storage bins and other fixtures were taken from their accustomed place and rearranged to form the orderly pattern of the present layout.

The focal point of the floor plan is the single assembly line which starts at one end of the plant, bends at right angles and finally terminates at the block test. Departments for manufacturing component parts of the engine are located along the assembly line, and at right angles to it, in the order of the sequence of assembly operations. Each department is self-contained, raw material starting at the head of the department and threading its way from operation to operation until it emerges a completed part. The finished piece is washed, inspected and delivered to the assembly line for immediate consumption.

Ideals of plant organization, of latitude in flexibility, and of plant management, have been realized in this renovation. Maximum utilization of machine tool equipment that has been made possible, together with a new standardized type of tooling which permits the processing of various sizes and types of similar parts on the same machine tool, have released $60,000 worth of machine tools for surplus sale and emergency use.

An intelligent treatment of floor space, relocation and regrouping of machines so as to eliminate handling and unnecessary movements of parts, have released for productive purposes 33,193 sq. ft. of floor space at a net saving yearly of about $50,000. What is more important, it has made available additional floor space without any alteration to the plant.

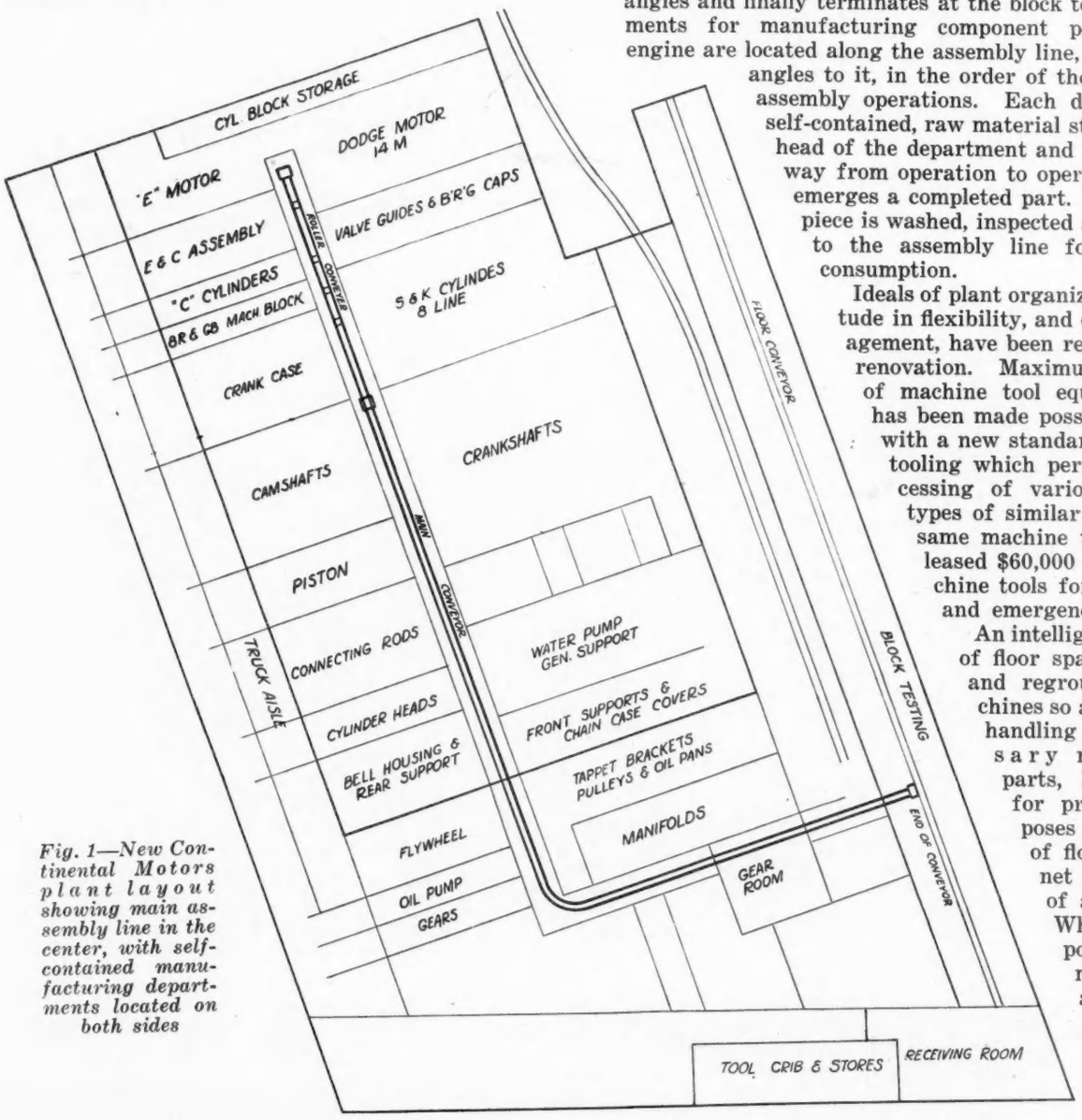


Fig. 1—New Continental Motors plant layout showing main assembly line in the center, with self-contained manufacturing departments located on both sides

Has *Central Assembly* Line Fed *Contained* Departments

partitions, storage bins and permits of daily changes schedules.

GESCHELIN

A comparative time study in every department which just has been completed reveals the possibility of reducing operating costs without affecting the earning capacity of the workmen, because the output per man will be increased proportionately.

In all probability, the chief reason for the successful outcome of the plan lies in the cooperation between the management and the men. Every detail was thoroughly thrashed out by a committee consisting of the works manager, plant superintendent, production engineer, tool engineer, foremen, gang leaders and members of the planning departments.

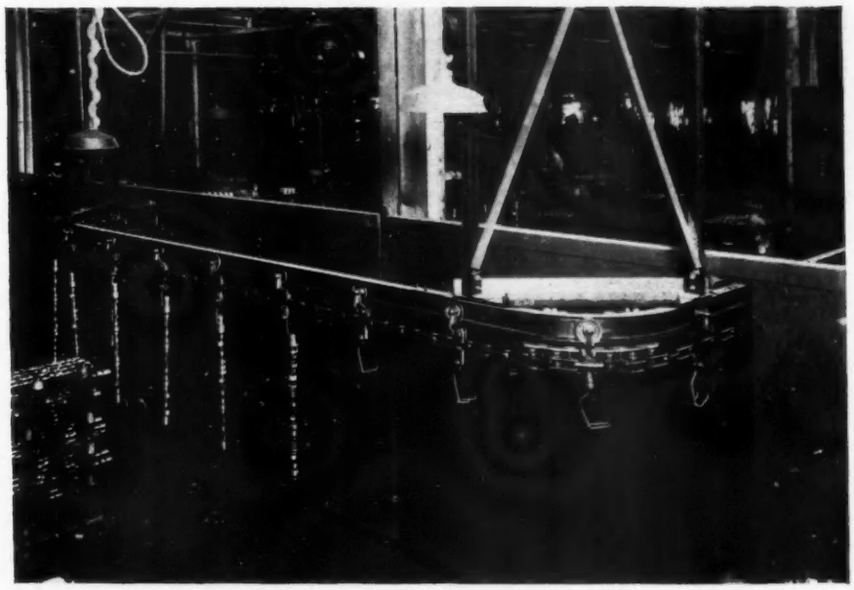


Fig. 2—Camshaft conveyor at the Continental plant. The camshaft department is in the background

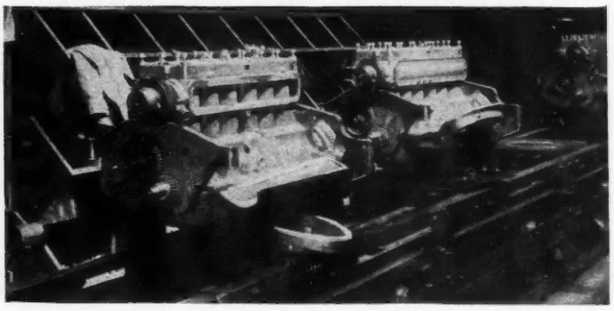
Fig. 3—Metal enclosing walls follow the main assembly line. Note the steel stock bins to the left of the line

Sweeping changes were suggested and put into effect. One of the most important of these is the elimination of the central stores department. All rough materials enter through the central receiving department, are washed, inspected, routed according to a distribution chart, and are delivered by electric trucks to the incoming depot at the head of each department. Incoming finished parts are washed, inspected, routed according to distribution charts, and are then placed on a floor conveyor which traverses the assembly line. As the parts pass the storage bins, placed at strategic points in the assembly line, they are lifted from the conveyor and loaded into the designated bay and bin (see page 536, *Automotive Industries*, Oct. 12, 1929). The schematic floor plan shown in Fig. 1 shows the simplicity and coherence of this new arrangement.

The assembly line conveyor starts at the cylinder block department at the extreme left. The various types of cylinder blocks have been divided into three groups, each of which feeds to the assembly line through a separate bay, making it possible to switch different types of blocks onto the line during the course of the day. The cylinder block department and the aluminum crankcase department are linked by a short roller con-

Fig. 8—Cleanliness of surroundings is a notable feature at the Continental plant. At the left is the stock delivery window between the crankshaft department and the assembly line

Fig. 4—The assembly line conveyor at Continental plant (below), showing the adjustable carriage



veyor which carries the block to the starting point of the main assembly line. This conveyor is provided with a turntable at each cylinder block bay connecting with a short roller conveyor set at right angles to the main line and communicating with the department. Thus it is possible to swing the blocks onto the line quickly and with little effort.

The self-contained manufacturing departments communicate with the assembly line by means of a window opening in which is placed the finished unit. The only exception is in the camshaft department, which is traversed and completely circled by an overhead conveyor opening into the assembly department as shown in Fig. 2. The assembly line continues to the front of the plant at the right, bends at right angles and terminates in the block test department, where the finished engines are removed by overhead cranes and set down on the test blocks.

In working out the assembly line layout, the primary thought was to maintain cleanliness both in component part departments and in the engine assembly as it progresses along the line. To carry out this idea, the assembly line has been enclosed by a steel partition, which seals it from the manufacturing department, as shown in Fig. 3. The only communication between a department and the assembly line is through the window opening and the several conveyors previously mentioned. To further insure cleanliness, work on the conveyor is confined to strictly assembly operations, thus incidentally eliminating the possibility of nicking or damaging component parts as they are installed.

The main assembly line conveyor consists of 115 buggies (Fig. 4) or carriages on the top side. Its speed may be varied with production requirements, and the camshaft conveyor is timed with it so as to effect complete synchronization. The initial step at the assembly line is to transfer the cylinder block from the roller conveyor to the first carriage on the main conveyor by means of an overhead hoist. Another example of the cleanliness maintained along the line is that each carriage as it emerges at the head of the conveyor is wiped clean before the block is laid upon it. From this point the block traverses the line through various stages of the assembly process.

At strategic stations parts for assembly are taken from the shelf and other small standard parts taken from the storage bins. As the finished engine approaches the end of the line it is filled with oil and is then taken off the conveyor by an overhead crane which carries it to the block test. Each engine is run on block test for four hours, being constantly inspected during this process. At this stage all adjustments are made on the ignition timing, carburetor, valve tappet clearances, etc. After completion of the block test, the engine is placed on its side on the floor conveyor which traverses this department, and as it passes inspection pits the used oil is drained off and the oil pan is removed and cleaned thoroughly. Near the end of the floor conveyor at the extreme left the pan is reassembled and the engine is ready for packing and shipment.

A noteworthy feature of the assembly line is the line inspector, who works up and down the line, noting carefully the various steps in the process. Among other things, he looks for damaged threads, studs and defective fastenings. If a defect is discovered, it is noted on a red tag, and when the engine reaches the bend in the assembly line, it is taken off by means of an overhead hoist and carried to the inspection repair table located along the wall nearby. Here the necessary correction is made, and the engine is returned immediately to the line. To insure cleanliness, this repair operation has been purposely divorced from the assembly operation.

Coming back to the floor plan for a moment, attention should be called to the receiving department at the upper right. All rough and finished parts enter there,

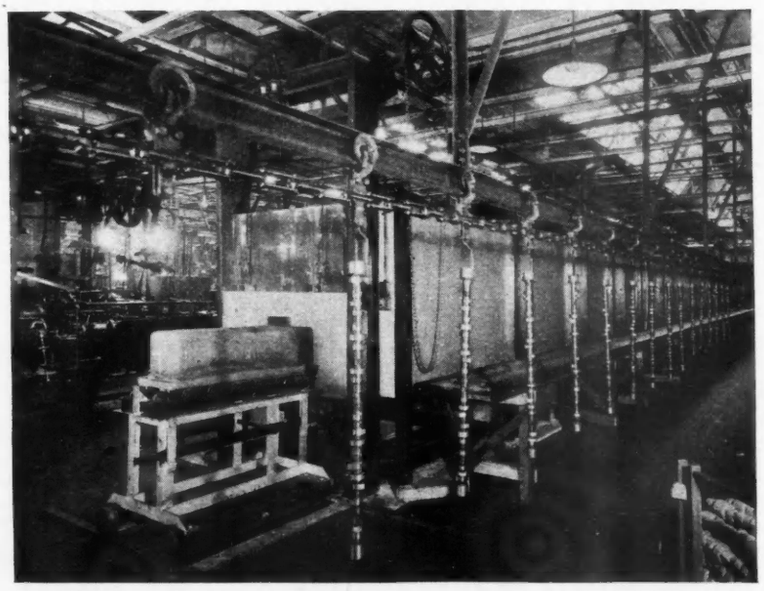


Fig. 5—Charge about to enter heat-treating furnace in camshaft department. Note the overhead conveyor

are washed, inspected and delivered to the point designated on the distribution chart provided by the planning department. Located near the receiving department is the central non-productive stores, from which point all non-productive materials are delivered to the various departments on requisition.

As was pointed out earlier, each department is a complete unit within itself, with a depot for incoming stores at its head along the trucking aisle. Parts are finished completely from the rough within the confines of a department, the direction of flow of material being from the front to the rear end, which communicates with the assembly line. Each department has especially adapted washing equipment and solutions through which the finished parts pass and then go to the inspector's bench, where they are given a 100 per cent inspection. The inspector is the last man in the department to handle the finished parts. He places them on the window for immediate consumption at the assembly line, so that no surplus is created at any time and no finished parts accumulate anywhere.

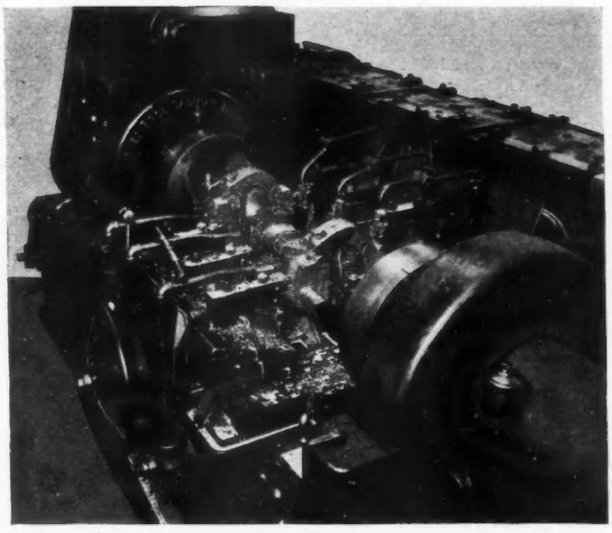


Fig. 6—A Wickes crankshaft lathe with universal fixture is used for handling various types and sizes of crankshafts. Note lateral tool slide adjustment on dovetail slots

The camshaft department may be taken as a good illustration of the unity of each manufacturing department. There the camshaft starts at the rear of the department, is packed mechanically in carburizing containers, and passes through a pusher-type counter-flow heat-treating furnace, shown in Fig. 5. After emerging, the camshafts are removed from the carburizing containers and pass down to the front end of the department, where they are straightened. From this point they go through the various grinding operations, cut off, and washing, and then are finish-inspected and hooked onto the overhead conveyor which carries them into the assembly department.

The Continental plant operates exclusively on the gang system, so naturally this was another determining factor in the layout. Maximum productiveness has been gained by grouping operations in their proper relation. This, linked with efficient utilization of space, economizes the man's steps and permits him to devote his entire attention to the productive operation.

An important advance has been made by the tool engineering department in developing standardized tool design for each operation and following this up with complete universality of each fixture for a family of similar parts. This has been done wherever possible, and a good example of the method is found on the Wickes crankshaft lathe for turning crank pins and finishing crank cheeks. This machine, as shown in Fig. 6, is arranged to handle every crankshaft the company makes. In many cases the same pot chucks can be used so that the only adjustment necessary in shifting from one crankshaft to another is to reset the turning tools. This has been worked out by arranging the tools so that they may be shifted laterally along the dovetailed ways.

Fig. 7—Inspecting piston alignment at the Continental plant. This installation has six tables, each with an integrally bolted fixture. The inspector selects the required set-up, swings the table into place and locks it by means of a pin

Another example of universality is found in the rough and finish-turning of pistons. It is accomplished by turning the piston on centers, using a plain center at the head end and special one at the open end on the inside chamfer. The piston is held in by air pressure of about 70 lb. per sq. in. at the tail end. This arrangement makes it possible to pass through any size of piston with an almost negligible amount of set-up time. An unusually interesting example of flexibility is found in the universal inspection fixture (Fig. 7) for checking the alignment of the piston and connecting rod. This fixture is built up in the form of a wheel, having six blades, each of which is a table with a complete inspection fixture bolted to it. The inspector selects the desired fixture, swings the table into place and locks it by means of a pin at the side. It is now possible to maintain a smooth flow of inspection, regardless of the variety of pistons that pass over his bench during the course of the day. Unquestionably the remarkable flexibility achieved through this scheme of standardization of tooling plays an important role in this new plant development. It makes possible the revamping of the production schedule during the course of a day. It helps to eliminate many machines which stood idle because of special operations reserved for them. And it permits maximum utilization of the equipment retained.

Latest ideas in inspection methods and procedure also have been incorporated. There now is an inspection bench arranged for progressive inspection in each department and a final inspector who is the last man to handle the work and to deliver it personally to the assembly line, thus insuring 100 per cent inspection of all major parts. One immediate benefit derived from this is the absence of trouble at the assembly line, and

(Continued on page 794)

White Iron Edges on Machined And Blocks Are Responsible

Fundamental reduction of the foundry design and pattern remove the fin on

By GEORGE
Molybdenum Corp.

EPIDEMICS of white iron edges, on machined surfaces of cylinder heads and blocks for internal combustion engines, are responsible for failure in meeting production schedules in many plants.

Such failures are a very serious matter, resulting in direct money loss, shaking the customer's confidence in his supplier, and possibly even resulting in the loss of contract business.

In addition to these vital commercial troubles, white iron edges produce serious internal shop complications in the shape of heavy tool costs, the failure of pieceworkers to make their rates, and other obvious and expensive irritations.

An investigation was made recently into the causes of white iron edges in several specific epidemics of this trouble. The irons investigated included: 1 — Unalloyed irons. 2 — Chrome-nickel irons. 3—Chrome-molybdenum irons.

No type of iron investigated was entirely immune from the trouble.

The uniformity with which the investigation of each specific case traced the trouble down to a common cause leads us to believe that it is a constructive service to bring the facts to the attention of the trade.

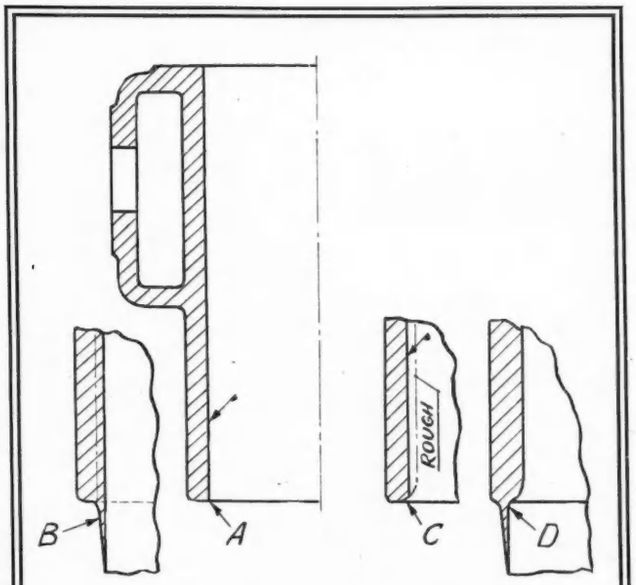


Fig. 1—Detail drawing of casting for the bottom of cylinder bore showing location of fins (at B and D)

In over 90 per cent of the individual white iron edged castings investigated the hard edge was due to the presence, on the rough casting, of a fin which landed on the edge in question and acted as a chill.

Of course, the presence of a fin on an edge that is to be machined does not necessarily mean that white iron will be encountered by the tool, but it does mean that when the variables which tend toward white iron edges, approach the danger point, the fin accelerates the trouble.

Among the variables referred to may be noted: high chromium, low silicon, low total carbon, cold poured metal and wet sand.

Molybdenum and nickel when alloyed in gray iron both have a definite tendency to prevent the formation of white iron edges, but alone they are not adequate as a preventive measure in all cases, and it is therefore only common sense to look for further assistance.

The first logical step is the prevention of the formation of the fin on the critical edge of the rough casting. This is sometimes a difficult problem, but it can be accomplished in a great many cases.

The only logical aim for this attack is the production of satisfactory finished castings at the least overall cost. If the elimination of the fin from the critical edge makes a more expensive pattern, core box, or core, this must be weighed against the ultimate monetary loss due to the practice which produces the trouble-making fin.

There are two general methods for preventing the formation of fins on edges which are to be machined.

1. Moving the parting line so that the fin lands on the rough casting, as far away from the machined surface as possible.

2. Grinding the cores to a fit so close that the fin is of immaterial thickness.

The moving of the parting line will often require the cooperation of the mechanical engineer who is responsi-

Surfaces of Cylinder Heads for Economic Losses

trouble can be made by modifying practice in a way that will the rough casting.

M. EATON
of America

ble finally for the completed design of the part.

For example, one of the most troublesome hard-edge epidemics of this kind that we have encountered the hard edge was at the bottom end of the bore of internal combustion engine cylinders.

If the detail drawing calls for a square corner at *A*, Fig. 1, it is a foregone conclusion that the pattern maker will arrange for a simple cylindrical core, and the rough casting will show a fin at *B*, unless the cores are very carefully ground to a close fit.

If, however, the detail drawing shows a round corner as at *C*, with the finish bore running out as shown, the fin will be located at *D*, and there will be no white iron encountered at the end of the bore unless some of the variables noted above have slipped so far that the entire bottom end of the cylinder is white.

Another practical illustration was a lot of split casings as shown in Fig. 2. On half of the casings in this lot white iron was encountered at *A*. The parting line was at *B*. Fins developed as indicated by the cross hatched areas *C*. The white iron was only just heavy enough to cause trouble on the edges. Moving the parting line to *D* would be very easy and would be a real improvement.

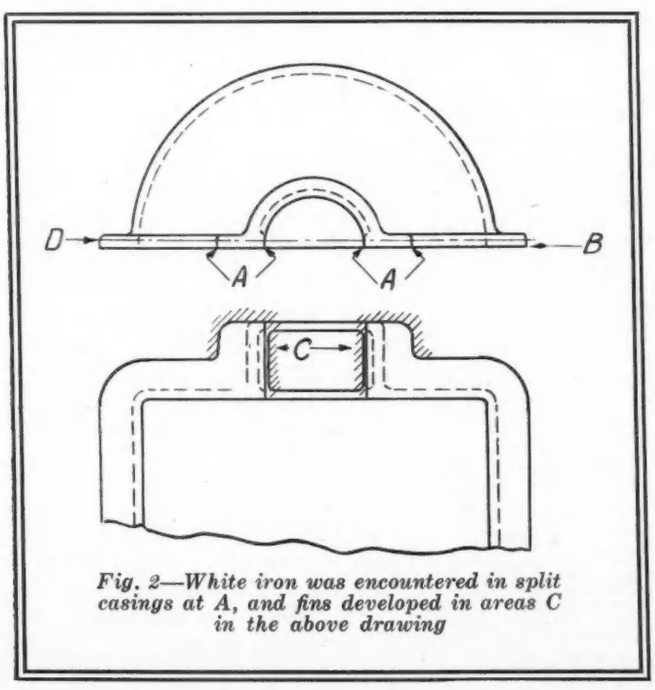


Fig. 2—White iron was encountered in split casings at A, and fins developed in areas C in the above drawing

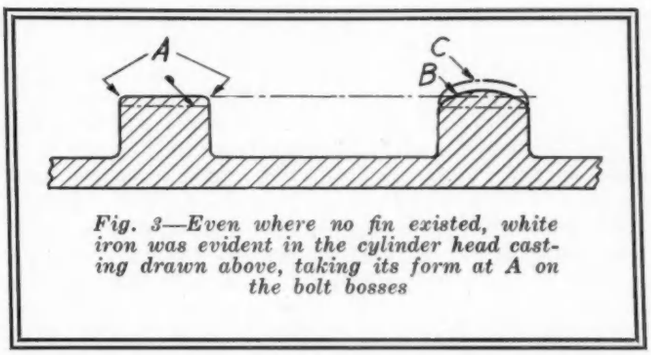


Fig. 3—Even where no fin existed, white iron was evident in the cylinder head casting drawn above, taking its form at A on the bolt bosses

A third case in which white iron resulted from a sharp isolated corner where no fin existed, was that of several lots of automotive cylinder head castings. This trouble took the form of white iron edges at *A*, Fig. 3, on the bolt bosses. The identical weight of metal could perhaps be employed to make the top of the boss of an elliptical cross section as at *B* with no opportunity for white iron to form, unless some detail of the foundry practice is very far from proper. It is a surer procedure, however, to add a little more metal, as shown at *C*, and thus insure that the finishing operation will clean up the boss to full diameter. This illustrates a condition where the designer can be of material assistance to the foundry and the machine shop.

There are a number of very logical reasons why the situation created by white iron edges is becoming more serious. Some of these reasons combine to create situations which are hard to correct, but which should and can be corrected.

The designer takes the position that he uses time-honored practices in proportioning his iron castings and that the foundry is responsible when a type of casting that was satisfactory a few years ago begins to give trouble. A similar stand is taken by the pattern maker and so on along the whole line of production.

The situation is particularly hard to handle when the castings are purchased outside of the manufacturing

organization, where there is a division of responsibility, and where each party is guarding his own costs.

The weakness of this widely held position lies in the fact that the gray iron around which the present design technique was evolved many years ago was a very different material from the iron which the designer demands today. Where Brinell values of around, say, 160 were once satisfactory, the designer has been forced by competition to raise his Brinell requirements to, say, 190 to 210 on castings for services involving tremendous tonnage and demanding increased strength, wear resistance, etc. This boosting of the strength and hardness of gray iron simply means that the foundry has been pushed closer to the limits of practical production of machinable iron.

This evolution automatically lays on the designer the responsibility of modifying his castings in every practical way, to ease the problem confronting the foundry. Most able designers need only to have this condition placed before them clearly to grasp the necessity of their learning the modifications of design which will result in the greatest possible overall reduction in the cost of their ultimate product.

Fundamentals at Issue

When unmachinable iron is reported by the shop, designers in this broad-minded group will attack the trouble on the basis that, owing to the recent fundamental changes in gray iron there is something they can do to the design of the rough casting that will eliminate or at least reduce the trouble. The fundamentals at issue may be summed up very tersely as follows:

The present technique of design for gray iron castings is directed almost exclusively toward the *finished casting*. The only safe basis today for the essential new design technique is the sharpest possible focusing on the *rough casting*, exactly as it comes from the sand, including all fins and other excrescences heretofore considered as only incidental to the finished product.

This calls for so much "hard plugging" on the part of the designer in adding to his store of knowledge an intimate familiarity with detail pattern and foundry practice, that many designers will be prevented either by the press of production or by mental and physical inertia from doing the necessary work.

This brings us logically to a consideration of the responsibility of the executive for unmachinable iron. The executive who grasps the importance of modifying designs and patterns in a way that will increase the margin of safety in the foundry and then fails to create a setting whereby his designers are permitted or forced, as the case may be, to take the necessary corrective measures, has only himself to blame for the continued high machining costs and loss of production, that are properly traceable to white iron. It is, of course, impossible to correct all going designs overnight, but it would be an economic crime to permit the designs of new engines to go out which are doomed by improper design to become addicts to the deadly white iron habit.

It is only logical to close with a word of caution to the foundry.

After every possible precaution has been embodied in the design, bad foundry practices may produce white iron. Therefore, when a white iron epidemic occurs the foundry cannot safely conclude that it is all up to the designer.

We have simply shown that the entire responsibility does not necessarily rest on the foundry.

Furthermore, it is a foregone conclusion that as soon as the designer finds that he is no longer troubled with white iron, he will inevitably stiffen up his specifications to secure a still stronger and more wear-resistant iron. Therefore, the foundry must keep on its toes to be ready to meet this coming demand.

We have directed most of our comments to the narrow range of cylinder heads and blocks, because of the great tonnages and consequent seriousness of the situation when trouble does occur. Everything that has been said applies equally in principle to all similar castings made of gray iron.

New Continental Plant

(Continued from page 791)

particularly on the block test. With but few exceptions Continental can now expect its engines to be exactly right when they reach the end of the assembly line.

Reduction of inventory is an important angle of the flexibility offered by this new plant layout. This is accomplished by the elimination of central stores and the scheduling of purchases closely to requirements. As a result, there is no surplus of rough or finished material, enabling the company to put through radical engineering changes, style changes and changes in requirements without taking losses in obsolete stock.

By linking manufacturing departments directly with the assembly line, the bulk of inter-departmental trucking has been eliminated. Moreover, special equipment such as crankshaft racks and carriages for oil pumps and water pumps no longer is needed. Previously, when Continental had two assembly lines, a feeder line and a central stores department, a large number of these special units was required and was increased constantly with the introduction of new models. The cost of maintenance on these racks was about $3,000 a year, not including outlay for new equipment. By eliminating departmental trucking and the handling of parts between departments and the stores, the company has disposed of five electrics and a large number of hand trucks. In this category may also be included 500 steel material containers which are no longer required.

Service Parts System

It is of special interest to note that service parts are drawn directly from current production and not scheduled separately. Parts desired for service are backed out of the department, that is, they go from the finished inspection at the rear end back to the front end, thence to the service depot. There they are received and checked again by a service inspector.

Manifolds arrive on the freight spur track shown on the floor plan, are sand-blasted and then pass through enameling and baking ovens which produce a lustrous, durable, porcelain finish. After enameling, the manifolds enter the machining department, where they are completely processed and pass to the assembly line.

The regrouping of machinery and the elimination of idle machines has effected remarkable economies. For example, 640 ft. of line shafting has been eliminated and with it numerous hangers and bearings. A saving of $2,482 in belting has been realized, and a notable reduction in maintenance is to be expected yearly from this one source. A careful check of power consumption indicates the possibility of saving at least $1,900 a month in electrical horsepower, due to the elimination of numerous electric motors, line shafting, hangers and bearings—all partially idle equipment which ate into the power supply.

Front-Drive Cars Open Field for New *Engine Design*

Metropolitan Section of S. A. E. sponsors discussion of principles and practices in applying power at forward end. Ruxton chief engineer gives experiences.

By P. M. HELDT

FRONT-WHEEL DRIVE was the topic at the November meeting of the S.A.E. Metropolitan Section, held on Thursday night of last week at 357 West Fifty-seventh Street, New York, the speaker being W. J. Muller, chief engineer of New Era Motors, Inc. Mr. Muller pointed out that his experience with front-wheel drive had been acquired in the development of the Ruxton car and that his remarks would be strictly applicable to that car only.

In this age of congested traffic, Mr. Muller said, about the first question asked regarding front-drive, is "How does it compare with rear-drive as regards length of wheelbase required?" His experience, he said, made it obvious that when the powerplant is properly disposed, front-drive requires no more wheelbase than rear-drive, for the same body space. Of course, it all depends on how compact the engine and transmission can be made without hindering their efficient performance. What hampers front-wheel drive designers most at present is the lack of a suitable engine, specially designed for front-drive and having all of the accessories so arranged as to minimize complications, particularly those arising from the fan drive. Mr. Muller expressed the opinion that if any manufacturer would develop an engine along these lines he would find a ready market among front-wheel-drive car manufacturers, and arouse interest also in other quarters.

The various advantages of the front-driven car were briefly referred to by the speaker, such as the lowering of the body floor which it permits, resulting in more comfort to passengers, a lower center of gravity, and greater stability; the light rear axle, which adds to the comfort of riding, and the absence of a long propeller shaft to the rear axle, which eliminates the need for careful balancing of such shafts and prevents the body noises and rumbles that often result from their vibration.

The most controversial question, Mr. Muller said, is the influence of the application of the driving torque. In front-drives the driving effort is always in the direction of motion, and it appears that this fact, more than any other, is instrumental in minimizing the skidding tendency of the car when negotiating sharp turns at fairly high speed. On the Ruxton car, which takes both the drive and the torque reaction on the front springs (which are shackled at the forward end) there is no tendency to steering wheel fight at any point of the speed range on any kind of road, even though a fully reversible type of steering gear is used. There never has been any indication of wheel shimmy or tramp, and this is thought to be due to the method of applying the drive and to the use of a type of universal joint at the outer end of the driveshaft which assures constant angular velocity.

The question of the tractive ability of front-drive cars is another much-discussed point, and on this the speaker had the following to say:

"For our own satisfaction we have been constantly watching very closely this particular feature, and we were quite astonished at the results obtained. In driving from Philadelphia to Indianapolis by way of Pittsburgh, and back, we were anticipating some difficulty in negotiating certain steep mountains. The front-wheel drive seemed not only to be an equally good hill-climber, but showed another feature quite unexpected. When climbing hills and at the same time making sharp turns, the rear-drive cars seemed to slow down somewhat; on the other hand, the front-drive seemed to pick up speed. Just what is the cause of this we are not prepared to say definitely. It seems, however, that the small deflection of the front springs of a front-drive car as against the large deflection of the rear springs with rear-drive has a whole lot to do with front traction. This is also evidenced in the small tire wear on front wheels of front-drive cars, which also points to the absence of tire slippage."

As regards weight distribution, Mr. Muller said that in the Ruxton five-passenger sedan, ready for the road, with two spare tires in fender wells, oil and water, but without passengers, the front end weighs only 150 lb. more than the rear, the complete car weighing 4000 lb.

Special Engine Needed

"WHAT hampers front-wheel-drive designers most at present is the lack of a suitable engine. If any manufacturer would develop an engine of special design for front-drive cars, and with the accessories so arranged as to minimize complications, particularly those arising from the fan drive, he would find a ready market among car manufacturers, and arouse interest also in other quarters."—W. J. Muller, chief engineer, New Era Motors, Inc.

In the discussion, Herbert Chase, of New York, said Mr. Muller had given a very good presentation of the features of front-drive but probably had insufficiently stressed some of its weak points. One of these, he thought, was low mileage on front tires. It had been the experience with some of the front-drive cars built that the front tires did not last very long, but it was a question whether this was due to the fact that they took the drive or whether it was the result of improper front-wheel alignment.

As regards the subject of tire wear, Mr. Muller said he had driven one of the Ruxton cars between 8000 and 9000 miles without the treads showing any marks of excessive friction.

A written discussion was read in part by F. H. Dutcher, instructor of mechanical engineering, Columbia University. In this it was pointed out that what counts with the car buyer today is performance and not high speed, and performance means acceleration or pick-up. It was then shown by mathematical reasoning that the limiting acceleration is greater with rear-wheel than with front-wheel drive, the reasoning apparently being based on the same weight distribution for the two cases with the cars on level ground and without torque applied. Mr. Dutcher added some comments of his own, holding that too great sacrifices are being made to enable cars to take everything on high. The result is that engines normally run at very light load and very uneconomically. "It is not necessary to power cars to climb the side of a house," he concluded.

George W. Dunham said one of the most attractive features of the front-drive was that it afforded opportunity for reducing the unsprung weight. The tendency at present is to improve the riding quality of cars, and reducing the unsprung weight is a step in that direction. Lowering of the center of gravity also was a desirable feature, as it permitted higher speed and tended toward increased comfort, the latter because it eliminated that unpleasant swaying motion which is so pronounced in many cars today.

Dr. William S. James, of the Studebaker Corp., discussed the driving characteristics of front-driven cars. He had been told that when rounding a turn at speed with such a car he must keep his accelerator pedal down, but after he had gone partly through the turn something happened, and the instructions, it seems, did not cover this case. Reduction of unsprung weight, it was pointed out, was decreasing in importance with the improvement of roads.

Negotiating Turns

C. W. Spicer, vice-president, Spicer Mfg. Corp., when called upon to discuss the paper, remarked facetiously that front-drive had one advantage over rear-drive that had not been mentioned by anyone so far—that it called for two propeller shafts instead of a single one.

Herr Ljungstrom, the Swedish steam turbine specialist, who has developed an automatic, continuously variable transmission which he brought to this country recently, also took part in the discussion. He referred to Mr. Muller's remark that in passing over the mountains of Pennsylvania he had noticed that in negotiating hairpin turns the rear-drive car slowed up perceptibly, whereas the front-drive car seemed to gain speed. The explanation, Mr. Ljungstrom said, would be clear when it was considered that if the front wheels could be swung around through 90 deg. the car would not be driven by the rear wheels at all, while it could still be driven by the front wheels. Therefore, in making sharp turns it made a difference where the power was applied.

The writer of this article discussed the reasons for the greater freedom from rear end skid as compared with rear-drive vehicles. The statement that in a front-drive car the power is applied in the direction the car travels is hardly correct, for when describing a curve the front of the car travels momentarily in a quite different direction from the rear. Perhaps what counts most from this point of view is the center of gravity of the car, and neither in a front-drive nor in a rear-drive car does the direction of the propelling force on turns correspond to the direction of motion of the center of gravity.

Road-Holding Qualities

What holds the rear end of the car in line normally is the directing tendency of rolling rear wheels. On ordinary roads the resistance to rolling motion is of the order of 20 lb. per 1000, while the resistance to sideward sliding of the tires on the ground is of the order of 600 lb. per 1000, and it is the difference between these two figures that tends to keep the rear wheels trailing behind the front wheels. Anything which reduces the difference between these two resistances to motion, such as wet, slippery roads, brings a skid nearer.

The greater freedom from rear-wheel skidding tendencies of front-drive cars is due chiefly to the better road-holding qualities of their rear wheels. In the first place, since the unsprung weight of the rear axle is much less with front-drive, that alone will hold the rear wheels more firmly in contact with the road and prevent them from slipping. Then, if power is applied to the rear wheels while the car is traveling fast over none-too-smooth roads, there will be a good deal of slip of the driving wheels as they completely or partly leave the road on hitting obstructions, which further reduces the difference between the rolling resistance and the sideward sliding resistance, and hence increases the tendency to skid.

With front-drive, however, there is a tendency to front-wheel skid, unless the car is handled at turns in a manner somewhat different than is customary with rear-drive cars. With an ordinary rear-drive car when going into a turn, we close the throttle to check the speed, for safety. With a front-drive car, if the throttle is suddenly closed while the front wheels are being swung around to make a turn, the front wheels will not obey the steering wheel but will skid sideways, describing a tangent to the curve which they are set to describe. This is due to the fact that when the engine is suddenly throttled it acts as a brake, and the front wheels cannot roll as fast as the stored-up kinetic energy of the car propels the latter. The skid can be stopped instantly by opening the throttle and thus removing the braking effect. It can be stopped also by unclutching.

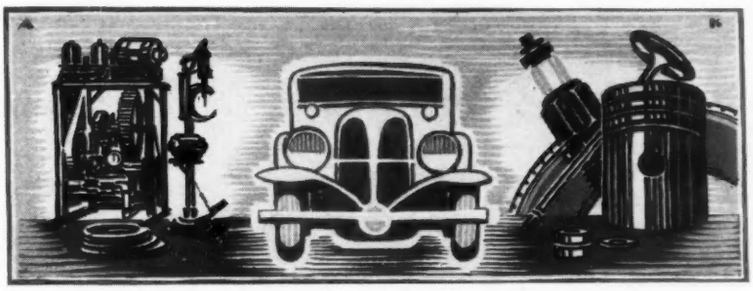
Driving Torque

"THE most controversial question which arises in discussions of front-wheel drive automobiles is the influence of the application of the driving torque. In front drives, the driving effort is always in the direction of motion, and it appears that this fact is instrumental in minimizing the skidding tendency of the car when negotiating sharp turns at fairly high speed."—W. J. Muller, New Era Motors, Inc.

M. E. A. and N. S. P. A. *Conventions Echo Trade's* Sane Optimism

Leaders of both groups stress maintenance of motor vehicles as an important feature of America's standard of living. Unity of purpose between associations evident

By LEON F. BANIGAN
Editor, Motor World Wholesale



ALTHOUGH staged at the height of Wall Street's recent fit of despondency, the annual trade expositions and conventions of the Motor and Equipment Association, Nov. 4 to 9, in Chicago, and the National Standard Parts Association, Nov. 11 to 15, in Detroit, presented an aspect of sane optimism and confidence.

Perhaps the dominant factor in the atmosphere of confidence that pervaded both gatherings was the keynote of maintenance service that was sounded by the leaders of both groups. On the convention floors, and in the exhibits as well as in the informal conversations in the lobbies of hotels, maintenance was the principal topic. Although the advantages of prosperity among manufacturers and dealers through large sales of motor vehicles was not entirely discounted, the thought that dominated and would not be downed was: "The motor vehicle has become such an important part of the business and social fabric of modern civilization in the United States, that its maintenance and use will never be curtailed by any normal business recessions. Furthermore, the present high standards of living in America embrace the enjoyment of many luxuries which will be forsaken before the actual use of motor vehicles is affected."

Another constructive and optimistic feature of both trade expositions was the dominance of display and interest in maintenance machinery designed to enable service stations and car owners alike to reap benefits from more economical and efficient repair work. If competition fails to impress the average service station proprietor with the necessity of using modern, economical machinery and methods, certainly a recession of business in 1930, whether predicated upon actual economic conditions or psychological reactions to Wall Street gyrations, should emphasize the necessity for modern equipment.

It was perhaps a happy coincidence that, even before a suspicion of a break in prices in Wall Street occurred, the Motor and Equipment Association was laying plans for a national campaign of education built around the slogan, "Care Will Save Your Car." And at the same time, the merchandising committee of the National Standard Parts Association was working definitely toward a program similar in its fundamental aspects.

The M.E.A. program was approved at Chicago in principle. Briefly, it contemplates the selling of franchises to repair shops at a nominal price, the proceeds of which are to be used in conjunction with other funds contributed by the association to an educational campaign to stimulate trade and public consciousness of the economical advantages of careful maintenance of motor vehicles.

Another note of optimism sprang from an unsuspected source—the accessory field. While activities of car manufacturers, in equipping their products with a few items formerly supplied through the after-market, had created a feeling in the wholesale trade that accessories were no longer a major profit item, it was hard to revive interest in them as a general line. However, a mere handful of accessory manufacturers sitting around a table one evening during the M.E.A. show discovered the fact that 16 of them sold $28,000,000 worth of accessories and supplies through automotive jobbers in the past year, contributing a gross profit of approximately $9,000,000. Out of this interesting bit of information surged a new enthusiasm which promises to be translated into definite merchandising force for accessories and

supplies during 1930. Certainly constructive optimism of this type will resist the bearish influences of the Wall Street aftermath.

Aside from the individual advantages enjoyed by manufacturers and jobbers in the contacts afforded at such gatherings, probably the most interesting aspects are those which carry with them potential future influences upon participants and the trade in general.

The physical similarity of the M.E.A. and N.S.P.A. trade expositions, from the standpoint of merchandise displayed, as compared with their total dissimilarity of five years ago, naturally led to the consideration of the consolidation of the shows at some future time. To the manufacturers of both associations, among whom there is an appreciable duplication in membership, the consolidated show idea appeals primarily from an economy standpoint. While it probably is wise to recognize a measure of sentimental opposition to a combined show on the part of some of the wholesaler members of the two associations, it is nevertheless a fact that attendance at both shows by wholesale members of both associations is becoming more desirable from a purely business standpoint. And so, in view of this fact, the economy of a joint show carries its appeal to the wholesaler members also. In the recent sessions of the associations the matter of a joint show in 1930 came up for specific discussion in the manufacturers' sessions and was generally quite favorably reacted upon. It is not betraying a confidence to say that the proponents of a joint M.E.A.-N.S.P.A. trade exposition in 1930 hope that the economy advantages of such a move will appeal to the jobbing members of both groups. It is suggested that convention sessions of the association be so arranged that each group of wholesalers may enjoy at least three days of contact with the manufacturers in the exposition booths.

Common Objective Evident

To an observer on the sidelines, the unity of purpose in both associations is probably more striking than it is to some of the individual members. M.E.A. wholesalers undoubtedly have taken long, constructive strides toward better service to the trade in the distribution of replacement parts. Parts wholesalers are observing a natural evolution of their business toward embracing tools and machinery necessary in the installation of parts in their distribution service to their customers. And in the trends that each have pursued individually there is, to the observer, the suggestion of approach from both sides toward a common objective which embodies the provision by both N.S.P.A. and M.E.A. wholesalers of a major distribution service to the retail trade embracing all of those maintenance items, parts, small tools, machinery and service station supplies and equipment, all of which provides the means of enabling the repair shop, whether independent or car dealer operated, to render better, more efficient and more economical maintenance service to the 23,000,000 motor vehicle owners.

Indeed, the present experiment of car manufacturers, tire companies, oil companies and other organizations in independent distribution of automotive supplies—presenting as they do a challenge to the services of both the N.S.P.A. and the M.E.A. wholesaler—may, in the final analysis, be the means of drawing the ranks of automotive wholesalers of all types closer together where the advantages and economies which may be gained by a joint trade exposition may even be broadened to include fusing of interests and merchandising forces; and, in the final analysis, to the advantage of the manufacturer-to-wholesaler-to-retailer method of distribution.

After all, the industry is more interested in the effects of such group gatherings than in the whirling of the actual convention wheels and cogs. Both sessions were intensely interesting, and in the N.S.P.A. convention particularly, there was the added spice of an East vs. West political contest.

The new officers and employees and headquarters staffs at the respective associations are as follows:

Motor and Equipment Association

President—J. M. McComb, Crucible Steel, New York.

Vice-president, Division A—M. B. Ericson, Houdaille-Hershey Corp., Chicago.

Vice-president, Division B—G. L. Brunner, Brunner Mfg. Co., Utica, N. Y.

Vice-president, Division C—S. L. Satchell, Motor Accessories Co., Allentown, Pa.

Treasurer—C. H. Burr, SKF Industries, New York.

Assistant Treasurer—C. C. Secrist, Victor Mfg. & Gasket Co., Chicago.

Secretary—C. F. Wright, Ballou & Wright, Portland, Ore.

Directors—E. R. Seager, Pennsylvania Rubber & Supply Co., Cleveland, Ohio; W. S. Isherwood, AC Spark Plug Co., Flint, Mich.; H. M. Behan, Chicago Auto Equipment Co., Chicago; G. H. Niekamp, Beck & Corbitt Co., St. Louis, Mo.; M. A. Moynihan, Gemmer Mfg. Co., Detroit; F. S. Durham, Bonney Forge & Tool Works, Allentown, Pa.; H. L. Horning, Waukesha Motor Co., Waukesha, Wis.; L. M. Wainwright, Diamond Chain Mfg. Co., Indianapolis, Ind.; C. H. L. Flinterman, Wilcox-Rich Corp., Detroit; L. A. Safford, McQuay-Norris Co., St. Louis, Mo.; E. N. Tarbell, Tarbell-Waters Co., Inc., Springfield, Mass.

National Standard Parts Association

President—R. A. Kiken, Motive Parts Co. of America, Inc., Chicago.

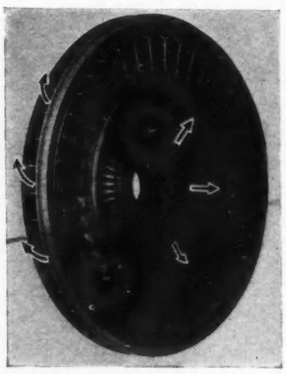
Vice-president—C. M. Burgess, Burgess-Norton Mfg. Co., Geneva, Ill.

Directors—J. N. Kirk, World Bestos Corp., Paterson, N. J.; H. Reisser, Link & Belt Co., Indianapolis, Ind.; E. P. Rotzell, E. P. Rotzell Co., Philadelphia, Pa.; O. M. Anderson, Northern Automotive Supply Co., Bay City, Mich.

Honorary director—T. H. Peacock, T. H. Peacock, Calgary, Alberta, Canada.

Lorenzen Turbo-Supercharger
(Correction)

IN the description of the Lorenzen supercharger in our issue of July 13, the statement was made that the air drawn in by the supercharger passes *between* the blades, and the fear has been expressed that this might give rise to a misunderstanding. The air, of course, does not pass between adjacent blades but through the interior of the hollow blades.



Rotor of Lorenzen supercharger, showing direction of air flow

Further along in the article reference was made to the "red-hot" blades of the supercharger. The blades, since they are internally cooled, do not become red-hot. It was also stated that the turbine of 2½ ft. diameter is claimed to develop 100 hp., but Mr. Lorenzen informs us that it is to develop from 1000 to 4000 hp.

Just Among Ourselves

No Dire Effect on Business From Stock Market Crash

THE United Business Publishers, Inc., owns some 35 business publications whose subscribers total somewhere in the neighborhood of 400,000 and whose trade contacts cover most of the important industries in the United States. The Chilton Class Journal Co. is the automotive unit of the U.B.P.

We happen to be one of a small committee of U.B.P. editors who have been spending the weeks since the first stock market crash in trying to find the uncolored facts about the effects of that much-talked-of phenomena. We started out by gathering some facts and a lot of opinions; within another week we will have a lot more facts to back up those opinions.

Try as we may thus far, however, we can't find any general or major calamities which have thus far resulted or which give promise of resulting. The word "caution" appears frequently in the statements obtained from hundreds of retailers and scores of manufacturers, but up to the present time no dire consequences have appeared in the offing.

* * *

Main Street's Usual Trade Outweighs Wall Street Debacle

PASSENGER automobiles and high-priced jewelry are the only lines covered by the survey to show marked recessions thus far. Even in these lines, the data indicates, it may be incorrect to attribute a major portion of the declines to the stock market situation.

The petroleum industry has not been affected much, while it looks as though buying of toys this Christmas would go on in as great volume as last year. Staple hardware lines, dealers report, are selling in volume quite equal to last year, while department store sales, taking the country as a whole, have been affected very slightly to date, despite current rumors, based on isolated cases, to the contrary.

Such important lines as shoes, plumbing, optical items and motor trucks, for example, report confidence in the immediate future along with very slight sales declines already registered as compared to last year. The survey indicates clearly that we, who live in the big towns, are very likely to get an erroneous impression of the amplitude of the stock market effect on business. Typical of the reaction of small town merchants to the market decline is the statement made by a hardware merchant in a small town in Oregon who says:

"Stock market crash doesn't interest us. People here don't even know what it means. Our business has shown an increase every month this year and is continuing to do so. Live stock is the only thing we hear anything about and that gives good reports in plenty of milk checks."

Main Street is going to be a more important factor in the business of the next six months than Wall Street.

* * *

Pessimism Unjustified in View of Facts

ALL this doesn't mean that the market decline will have no effect on business at all. It has had and it will have, almost certainly. These widespread findings, however, do indicate that that calamity howling of the very pessimistic kind that one can hear over almost any big city luncheon table is not justified.

At the risk of getting ourselves elected to the Growing Society of Windjammers and Bubbling Babbitts we suggest the following motto for automotive companies and executives:

"Workers will win in 1930."

* * *

Reaction to Sincerity Similar in Any Language

MEN who have been working in the selling end of the automobile business in Europe often tell us that American manufacturers frequently fail to realize that conditions over there are somewhat different than they are in the United States, and that, consequently, some policies which might work well here fail badly when applied over there.

We heard this same thing recently, as our informant went on to describe some of the policies which, he claims, have been making European dealers feel unfriendly to American automotive manufacturers. However, we began to disagree with his major premise. The complaints, which he said European dealers were registering, had a strongly familiar ring.

He talked about sudden cancellation of contracts with little cause and no warning; the shouldering on to the dealer of all financial responsibility and most of the merchandising responsibility, once the manufacturer had received his cash in New York; attempted overloading of dealers; refusal to buy back parts on hand when sudden cancellations occurred and similar other items.

Most of the abuses which he mentioned don't work any better in the United States than in Europe. Business standards differ somewhat in their application from country to country, but we miss our guess if sincerity, frankness and consistent fairness don't get favorable reaction in almost any language.

—N. G. S.

INSTALMENT PURCHASING OF CARS SHOULD STIMULATE 1930 SALES

(Continued from page 783)

cates, eligible for rediscount among member banks.

"These specific proposals," said Mr. Ayres, "go very much further, and involve a much wider departure from the original plan, than does our proposition for the admission of finance company paper. They amount, however, to strong endorsements of our stand that something needs to be done to offset the decrease in paper."

Within the six months following the delivery of the address by Dr. Burgess, Mr. Ayres said, the amount of eligible paper held by national banks decreased from 15 per cent to 13¼ per cent of their loans and investments.

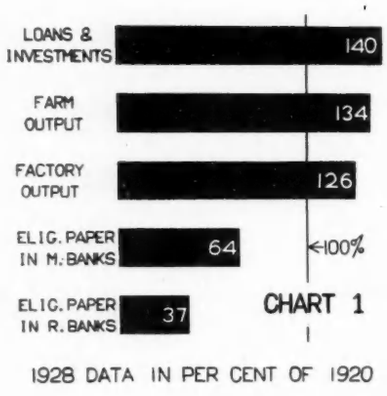


Chart 1 — The lengths of the bars show how the measures of business activity named on the diagram compared in volumes in 1928 with their volumes in 1920 Loans and investments of member banks of the Federal Reserve System in 1928 are indicated as having been 140 per cent of what they were in 1920, while the index of agricultural production was 134 per cent, and that of industrial production 126 per cent, but the eligible paper held by member banks only 64 per cent and the eligible paper held by reserve banks only 37 per cent

"Here we have the clue to the bankers' attitude," said Mr. Ayres. "They are concerned because that fraction of their assets which consists of eligible paper is constantly growing smaller. Not only has the amount of eligible paper been decreasing for years, but at the same time the volume of banking business and the volume of business and industry generally on which the banking business is based, have been increasing rapidly, so that the growing deficiency of eligible paper with reference to the needs of business is more acute than indicated merely by its numerical shrinkage."

Mr. Ayres showed in Chart 1 by the length of bars how these measures of business activity for 1928 compared with their volume for 1920. Loans and investments of member banks of the Federal Reserve System in 1928 are indicated as having been in 1928 140 per cent of what they were in 1920, while the index of agricultural production was 134 per cent, that of industrial production, 126 per cent, but the eligible paper held by member banks was only 64 per cent and the eligible paper held by reserve banks only 37 per cent.

Despite the shrinkage in the amount of eligible paper and the expressed desire of bankers for more of it, banks generally are not borrowing from reserve banks as much as the existing volume of such paper will permit, it is evident from the two lowest bars in the diagram. They show, as Mr. Ayres pointed out, that eligible paper held by the reserve banks—that is, rediscounted paper—has decreased much more than that held by member banks. The figure for eligible paper in both member and reserve banks was given as 55 per cent, indicating that while loans and investments were increasing 40 per cent, eligible paper had decreased 45 per cent.

Since eligible paper is held by the commercial banks of the country as a sort of secondary reserve, Mr. Ayres said, a larger proportion of it naturally is rediscounted at a time of high interest rates or credit stringency, but even then the greater part is held by the member banks. This is shown by the columns of Chart 2. They indicate what percentages of all eligible paper in the hands of member and reserve banks were in the reserve banks at the end of 1920 and on June 30 of the years 1926, 1927, 1928 and 1929.

Starting with 29 per cent in 1920, the figure dropped to 10 per cent in 1926 and 9 per cent in 1927. During the first half of 1928, it rose from 9 to 22 per cent, where it remained until June 30, 1929, the date of the latest available figures.

"Even during the depression of 1920," said Mr. Ayres, "apparently not as much as one-third of the existing eligible paper was rediscounted, so it seems a logical deduction that for some reason, dependent on practical banking methods, it is not practicable to rediscount more than about one-third of the eligible paper existing at any one time."

The amounts of eligible paper as learned from all the available figures are given in Chart 3. The heights of the first three columns represent the total amounts of eligible paper present in all the member and reserve banks at the end of 1920 and as of June 30, 1923, and 1929. The figures are in billions of dollars.

The amount of eligible paper at the end of 1920 undoubtedly was above normal, Mr. Ayres said, while he considered it not an unreasonable assumption that it was normal in 1923. The amount he calculated should have been normal in 1929 is indicated by the height of the last column on the right of Chart 3. Mr. Ayres explained that this amount was arrived at by multiplying the 1923 total by the ratio of total loans and investments of member banks for the two periods.

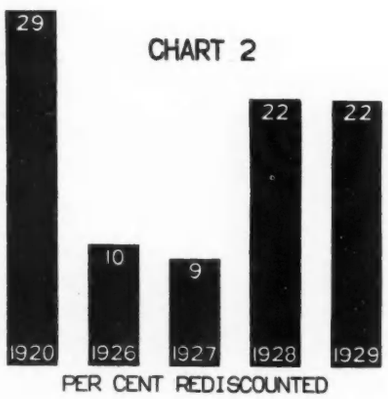


Chart 2 — The per cent of eligible paper rediscounted is shown by the columns in this diagram They indicate what percentages of all eligible paper in the hands of member and reserve banks were in the reserve banks at the end of 1920 and on June 30 of the years 1926, 1927, 1928 and 1929

"In the six years from 1923 to 1929, loans and investments increased 35 per cent," he said. "It is assumed that eligible paper should also have increased 35 per cent. That results in a 'normal' of $8,230,000,000 as compared with an actual total of $5,440,000,000, leaving a deficit of $2,790,000,000. That is the approximate amount of new eligible paper apparently needed now."

"Allowing for errors in our estimates," continued Mr. Ayres, "it seems probable that the amount of paper to be made eligible by the proposed change would be not less than one billion and not more than one and one-half

(Continued on page 802)

COMPOSITE EXPERIENCE OF FINANCE COMPANIES AND AUTOMOBILE DEALERS

Prepared by National Association of Finance Companies, 33 South Clark Street, Chicago

PASSENGER CARS

		1925	1926	1927	1928	1929
	AVERAGE DIRECT LOSS PER REPOSSESSED CAR*	$	$	$	$	$
1	—12 or less equal monthly payments	50	65	43	56	60
2	—13 to 18 equal monthly payments	78	94	58	75	83
3	Balloon note or over 18 monthly payments	220	158	**	**	112
	INCREASE OF LOSSES OVER STANDARD TERMS	%	%	%	%	%
4	—13 to 18 equal monthly payments	57	44	35	34	38
5	Balloon note or over 18 monthly payments	341	143	**	**	87
	PERCENTAGE OF REPOSSESSIONS	%	%	%	%	%
6	New cars with down payment of 33.3%	1.7	2.1	2.7	2.8	2.8
7	New cars with down payment of 25%	3.8	4.0	5.9	4.1	5.1
8	New cars with down payment of less than 25%	11.0	11.5	**	**	**
9	Used cars with down payment of 40%	3.0	4.3	5.2	5.3	5.3
10	Used cars with down payment of 35% or less	6.2	8.6	6.9	10.9	9.0
	INCREASE OF REPOSSESSIONS OVER STANDARD TERMS	%	%	%	%	%
11	New cars with down payment of 25%	122	92	115	46	82
12	New cars with down payment of less than 25%	537	451	**	**	**
13	Used cars with down payment of 35% or less	105	101	31	93	70
	AVERAGE AMOUNT OF NOTE PURCHASED	$	$	$	$	$
14	New cars	550	595	574	606	591
15	Used cars	280	277	286	295	287
	PERCENTAGE SOLD ON INSTALMENTS	%	%	%	%	%
16	New cars	68.2	64.5	58.0	58.1	62.6
17	Used cars	62.8	65.2	63.1	60.8	65.1
18	All cars	65.5	64.8	60.8	59.5	64.0
	PERCENTAGE OF TRADE-INS, SALES, ETC.	%	%	%	%	%
19	Trade-ins on sales of new cars	...	...	72.0	69.4	72.5
20	Trade-ins on sales of used cars	...	...	37.1	39.4	45.5
21	Total trade-ins in % of new cars sold	99.0	90.0	116.0	115.5	127.1
22	Used cars sold in % of new cars sold	...	...	118.5	117.0	128.6
23	Used cars junked in % of total trade-ins	...	...	6.9	8.1	9.2
24	SKIPS PER 1000 TRANSACTIONS	...	...	...	4.7	5.2
	INSTALMENT PAPER RATIOS	%	%	%	%	%
25	Retail paper with more than 12 monthly payments	18.3	13.2	12.4	14.5	14.9
26	Retail paper with less than standard down payment	19.4	9.0	5.2	6.1	8.0
27	New car paper to total paper purchased	69.0	67.0	73.2	64.5	58.2
28	Used car paper to total paper purchased	31.0	33.0	26.8	35.5	41.8
29	Number new cars to total financed	53.1	48.6	57.6	46.9	40.3
30	Number used cars to total financed	46.9	51.4	42.4	53.1	59.7
31	Used car paper per cent with recourse***	...	...	65.8	66.0	66.3
32	Companies taking all used car paper with recourse***	50.0	46.0	36.8	37.6	38.0
33	Companies taking part used car paper with recourse	44.0	40.0	55.6	54.8	56.2
34	Companies taking all or part used car paper with recourse	94.0	86.0	92.4	92.4	94.1
35	Used car paper above Blue or Red Book appraised value	...	...	...	27.3	29.3

COMMERCIAL CARS

		1927	1928	1929
	AVERAGE DIRECT LOSS PER REPOSSESSED CAR*	$	$	$
1	—12 or less equal monthly payments	46	121	68
2	—13 to 18 equal monthly payments	57	**	137
3	Balloon note	**	**	**
	INCREASE OF LOSSES OVER STANDARD TERMS	%	%	%
4	—13 to 19 equal monthly payments	24	**	101
5	Balloon note	**	**	**
	PERCENTAGE OF REPOSSESSIONS	%	%	%
6	New cars with down payment of 33.3%	2.6	3.5	2.8
7	New cars with down payment of 25%	**	**	3.0
8	New cars with down payment of less than 25%	**	**	4.8
9	Used cars with down payment of 40%	4.2	3.1	5.4
10	Used cars with down payment of 35% or less	**	**	7.8
	INCREASE OF REPOSSESSIONS OVER STANDARD TERMS	%	%	%
11	New cars with down payment of 25%	**	**	7
12	New cars with down payment of less than 25%	**	**	71
13	Used cars with down payment of 35% or less	**	**	44
	AVERAGE AMOUNT OF NOTE PURCHASED	$	$	$
14	New cars	840	832	870
15	Used cars	368	395	381
	PERCENTAGE SOLD ON INSTALMENTS	%	%	%
16	New cars	54.9	51.6	45.6
17	Used cars	52.4	48.3	57.7
18	All cars	53.4	50.4	49.5
	PERCENTAGE OF TRADE-INS, SALES, ETC.	%	%	%
19	Trade-ins on sales of new cars	52.5	51.2	54.3
20	Trade-ins on sales of used cars	22.2	22.3	31.1
21	Total trade-ins in % of new cars sold	67.7	64.1	72.6
22	Used cars sold in % of new cars sold	68.6	57.8	57.5
23	Used cars junked in % of total trade-ins	10.8	16.4	16.3
24	SKIPS PER 1000 TRANSACTIONS	...	.8	3.5

* This means amount owing minus amount received from sale. ** No cases reported, or too few to justify inclusion.
*** Including repurchase agreement.

NOTE. This tabulation represents the composite experience of a large number of representative finance companies and is based upon individual averages for the first nine months of each year. Items 16-23 inclusive are derived from reports made by many automobile dealers, representative of the whole country, obtained through the courtesy of the National Automobile Dealers' Association.

(Continued from page 800)

billions. This is far less than sufficient to make up the present apparent deficiency of 2.8 billions in our supply of eligible paper, although it would be a substantial contribution toward that end, and is certainly too small to justify the slightest apprehensions that it might contribute to an inflation of credit or to any other unsettling of the nation's fiscal organism."

The estimate of Mr. Ayres as to the amount of finance paper that would be made eligible by the proposed amendment of the act or change in the regulations formulated by the Federal Reserve Board is illustrated by Chart 4, the figures being in billions of dollars. The top bar represents the total estimated annual volume of paper purchased by finance companies; namely, $4,000,000,000.

Deficiency in Eligible Paper

"If this were all instalment paper paying out in 12 months," said Mr. Ayres, "the average amount outstanding at any one time would be a little over 50 per cent of the annual volume. But while some runs for a longer time, a greater amount undoubtedly is for less time, and a considerable fraction is wholesale paper in short-term notes of single maturity. We may assume, then, that the average outstandings amount to 40 per cent of the annual volume, or 1.6 billions, represented by the second bar. Only part of that is borrowed from the banks, the balance being supplied by the capital and surplus of the finance companies. Assuming that three-fourths of it is borrowed, we have 1.2 billions, represented by the third bar, as the amount of finance company paper in the hands of the banks. This compares with the bottom bar, which represents the computed deficiency of 2.8 billions."

In explaining how modern tendencies in business are bringing about a growing need for the creation of more eligible paper, or the admission to eligibility of certain kinds not now eligible, Mr. Ayres said:

"Under the time-honored plan of manufacturing and marketing goods, the manufacturer borrows on his notes to pay for his materials, and to meet his payrolls. These notes are eligible for rediscount. The wholesaler may accept a time draft or trade acceptance, or may give his note to finance the purchase of the goods. These papers are eligible. The retailer may do likewise, and create more eligible paper. Even the notes of the ultimate consumer, given for part of the purchase price are eligible, if of less than 90 days maturity.

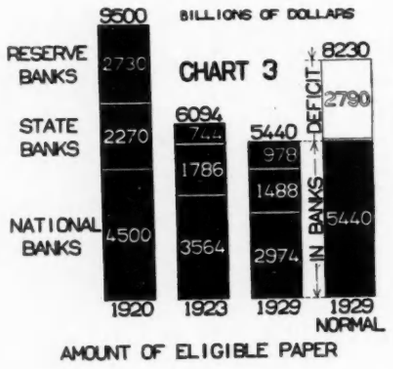


Chart 3 — The amounts of eligible paper as learned from all available figures are given herewith

The heights of the first three columns represent the total amounts of eligible paper present in all the member and reserve banks at the end of 1920 and as of June 30, 1923 and 1929. The amount it was calculated should have been available normally in 1929 is indicated by the height of the fourth column. The figures are in billions of dollars

"Contrast this with the modern plan, as exemplified by the automobile industry, where the manufacturer seldom has to borrow, because he has no accounts receivable; he gets his money on delivery of the goods. There is usually no real wholesaler. The dealer may have to borrow to some extent and his notes are eligible, but the big end of the financing comes in the sale of the cars on instalments. The instalment notes of the ultimate consumer are purchased by finance companies, which borrow from the banks to obtain the funds needed to buy the instalment notes. The finance companies' notes are not eligible, although they really represent the modern substitute for the old plan of financing the several steps in production and distribution, which produced a large volume of eligible paper.

"This shift in financing away from producer and distributor credit in the direction of consumer credit, is by no means confined to the automobile industry. It is occurring to an increasing extent in many other lines, particularly in those which involve the more modern adaptations of science to consumer needs, as exemplified in the case of mechanical refrigerators, oil burners, domestic stokers, radios and the like. It is also taking place where the consumers are not merely individual users or home owners, but are themselves industrial or commercial concerns. We hear of cases, for instance, where a manufacturer buys as much as a half million dollars' worth of machinery for his factory on the instalment plan, the contract being purchased by a finance company. Here, the maker of the machinery gets his money at once upon delivery of the goods, and is not obliged to borrow from the banks in order to extend 90 days credit or more to his purchaser, and thus the creation of eligible paper is forestalled.

"Another way in which finance companies facilitate manufacture and distribution," continued Mr. Ayres, "is in the purchase of accounts receivable. The manufacturer sells to the finance company the right to collect his receivables. The finance company borrows from the banks on its own notes, which are not eligible for rediscount, but by this transaction it has obviated the necessity for the manufacturer borrowing from his bank, and has thus forestalled the creation of eligible paper."

"By admitting to eligibility the notes of finance companies, the proceeds of which were to be used in purchasing instalment contracts," continued Mr. Ayres, "we should have a relatively small number of fairly large notes, made by companies whose reputation and financial condition would be known to the banks, instead of a vast number of small notes by unknown makers. We should have acceptable, instead of unacceptable, paper."

Underlying Notes Diversified

Mr. Ayres voiced assurance that finance company paper is safer than the average run of commercial paper. He said this was due to the fact that finance company notes are secured by a vast number of underlying notes of different makers, so that if reasonable and customary care has been used in investigating these makers, there is practically no possibility of enough of them defaulting to jeopardize the solvency of the finance company. "It is apparently true," he said, "that even when finance companies have failed, no bank has ever suffered any substantial loss as a result."

As evidence that finance companies can weather business storms, Mr. Ayres referred to the general business depression of 1921-1922.

It is generally assumed that practically all the finance companies have come into existence since that depression, but the facts are otherwise. In a recent study made by the National Association of Finance Companies, data were obtained in regard to 302 companies doing business at the close of 1928. Of these,

64 companies began business prior to the end of 1920. These 64 companies, at the end of 1928, had 78 per cent of the total number of employees of the entire 302 companies. Inasmuch as all the large companies are included in the returns, it appears probable that more than three-fourths of the finance company business in 1928 was done by companies which had operated during the big depression."

Certain of the views of Mr. Ayres on the desirability of finance company paper being made eligible for rediscount were shared by Arthur W. Newton, vice-president of the First National Bank, Chicago, who addressed the conference on the topic, "Relations of Banking and Instalment Sales Financing."

"It has never been quite clear to me," said Mr. Newton, "just what the objections are to the eligibility of finance paper. Such paper is made for the purpose of financing industry, it is certainly self-liquidating, and experience shows that, capital for capital, finance company notes are as safe a risk as the notes of merchants or manufacturers. It appears to me a paradox that the notes of a manufacturer or dealer who has borrowed to carry merchandise not yet sold should be eligible, whilst the paper of a finance company, given to finance merchandise already sold, the receivables of which are being collected monthly, should not be eligible.

"It has been suggested that I discuss the prospects of banks engaging in the financing of instalment sales. The best answer I can give to this is that so far they have not, to any considerable extent, done so, and I see no reason to believe that they will. Such financing would necessitate highly specialized credit and collection departments such as few banks are prepared to establish. No bank can afford to have more than a certain proportion of its resources tied up in instalment financing, and it is simpler, safer, and in the long run, probably as profitable for the banks to carry the lines of finance companies as it would be to do the business direct. Whether the establishment of branch banking would result in banks handling this class of business, I cannot say, but I do not think it would."

Ask Instalment Sales Census

Besides the resolution advocating the eligibility of finance company paper for rediscount at Federal Reserve Banks, and requesting the president of the association to appoint a committee of five to direct a program intended to bring about this change, the association adopted resolutions urging automobile manufacturers to agree upon an easily accessible location on cars for serial numbers, requesting the Bureau of the Census to take a census of instalment selling and its financing and urging the membership to cooperate in the undertaking, authorizing the management of the association to negotiate with the authorities concerned with a view to coordinating the use of identification marks and the indexing of them, and ratifying former recommendations as to "standard terms" and urging compliance therewith throughout the United States.

The "standard terms" referred to specify that the maximum maturity of new and used car paper shall not exceed 12 months, in equal monthly instalments, and that the down-payment shall not be less than one-third on new cars and 40 per cent on used cars. Light delivery trucks and chassis listing at more than $1,500 are to be included, as heretofore, in this connection. It was further recommended that in used car transactions the amount of the instalment note should not exceed Blue Book or Red Book average appraised values for the United States.

Officers and directors elected were: President, Victor L. Brown, of Milwaukee; first vice-president, O. Rey Rule, Los Angeles; second vice-president, R. P. Babcock, Jamaica, L. I.; third vice-president, L. M. Rocheford, Minneapolis; fourth vice-president, J. C. Allaback; secretary and manager, C. C. Hanch, Chicago; treasurer, W. G. Tennant, Chicago; directors, T. E. Byrnes, Boston; Henry Ittleson, New York City; Arthur J. Morris, New York City; Gilbert Norwalk, Cleveland; Glenn B. Ryman, Atlanta; T. C. Tupper, St. Louis; J. T. Cronkhite, Wichita, Kan., and William M. Klinger, San Francisco.

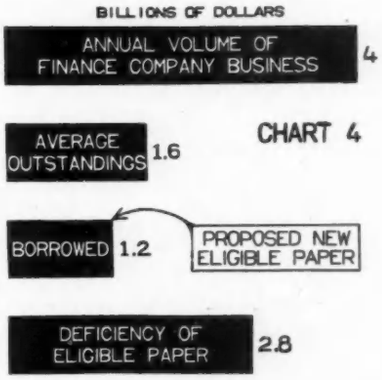


Chart 4—The estimated amount of finance company paper that would be made eligible by the proposed amendment of the Federal Reserve Act or the proposed change in Regulations of the Federal Reserve Board is illustrated herewith, the figures being in billions of dollars

The top bar represents the total estimated annual volume of paper purchased by finance companies, namely, $4,000,000,000. The second bar represents the estimated average amount that would be outstanding if the paper were eligible, or 1.6 billions. The third bar shows the amount of finance company paper that probably would be in the hands of the banks, if eligible, namely 1.2 billions. The fourth bar visualizes the deficiency of 2.8 billions in the present supply of eligible paper in the United States

Finance companies were urged by Nathan B. Williams, an attorney of Washington, D. C., to fight for the interpretation by the courts of the complication of laws under which automobiles now are seized in the enforcement of prohibition. He addressed the gathering on the subject "Losing Cars Legally."

"A car with a pint of liquor in the rear pocket may still be confiscated by the government under the Customs Act, under the Internal Revenue Act, for not paying the tax on the liquor, although of course the tax could not possibly be paid in any case, or under the Volstead Act," said Mr. Williams. "Under the Volstead Act, provision is made for a finance company, or any other innocent owner of an equity in the car, to recover his machine through court procedure. But if the car happens to be confiscated under either one of the earlier acts, the owner may go through a series of legal proceedings leading up to the Secretary of the Treasury, and still fail to recover the property.

"The Federal Government alone has confiscated 4063 cars with an appraised valuation of $2,418,527 since 1925 to be used for enforcement purposes.

"Under either the Customs or Internal Revenue Acts, which still are perfectly valid, an innocent owner may recover legal damages for a car that has been confiscated and sold—and then find that he cannot be paid because under the Act of March 3, 1925, customs—prohibition funds are not allowed for that purpose unless the lien be allowed by the court.

"Until these conflicting provisions and overlapping laws are clarified," continued Mr. Williams, "talk of law enforcement is absurd. Laws to be respected must be respectable."

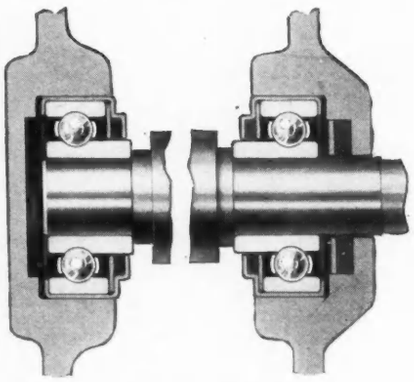
The time and place for the next meeting of the association is to be determined later through ballots to be mailed by the secretary.

NEW DEVELOPMENTS—Automotive

Bearing by New Departure

A SELF-SEALED, self-lubricated ball bearing, which is said to reduce mounting costs and at the same time increase bearing efficiency and service life, is announced by the New Departure Mfg. Co., Bristol, Conn.

The N-D-Seal bearing, as it is called, is made only in the smaller sizes, and consists of a New Departure single-row ball bearing of the non-loading groove type, permanently fitted into a metal case or shell.



A typical mounting of the N-D-Seal bearing

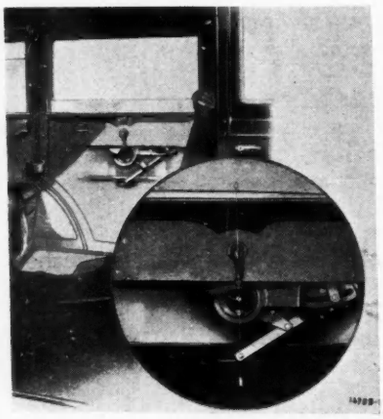
This shell is shaped on one side of the bearing so as to contain a felt closure which fits over the ground outside the diameter of the extended bearing inner ring, thus forming an efficient seal both for the retention of lubricant and the exclusion of dirt.

While the inner ring is carried slightly beyond the face of the seal, the overall width of an N-D-Seal bearing is much less than the space occupied by a standard bearing of the same size together with a separate closure member. Outside diameters and bores are standard.

The capacity characteristics of N-D-Seal bearings are substantially the same as corresponding sizes of non-loading groove single-row bearings.

Vertical Window Lift

A NEW automobile window lift, known as the No. 27 Common Sense Vertical Lift, which is claimed to combine the advantageous features of the vertical lift type with the quick action of the gear type, has been announced by Ackerman-Blaesser-Fezzey, Inc., Detroit.



Details of the No. 27 Common Sense Vertical Lift

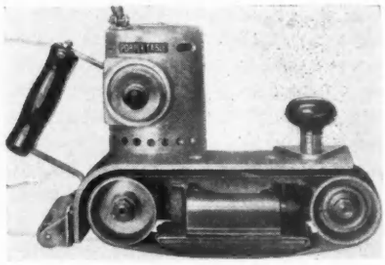
Company claims for the new lift state that for the first time it totally eliminates in single armed geared type regulators, all twisting forces on the glass, and that the glass corners will not project into the side channels, enabling a closer fitting of the glass with assurance of continued smooth operation. By the use of the short arm control, the strain on the gears is said to be reduced by one-half and the sliding of the arm from one side to the other in the channel is eliminated.

Other design features of the new lift are said to include a very small cutout in the lockboard and simplicity of installation. Maximum rising distance is given as 16 1/7 in. A 22⅜ in. minimum width between pillars is required for its use.

Take-About Sander

A HIGH-SPEED portable sander equipped with a high-frequency motor is introduced by the Porter-Cable Machine Co., Syracuse, N. Y.

This new machine is designated in the Model B-7 and is similar to the types B-4 and B-5, except for the high-frequency motor, which at 180 cycles develops a speed of 10,800 r.p.m. The high belt speed (1800 r.p.m.) is said to be of particular utility for metal and body grinding and finishing.



Porter-Cable portable sander

The motor is rated at 1½ hp., three phase, 220 volts, 130 cycles. Total weight of this machine is 21 lb. Its size is 6 in. by 15 in. by 9 in. high.

Counter E. M. F. Starter

A NEW counter E.M.F. type automatic starter, for small D.C. motors on general applications, is announced by Cutler-Hammer, Inc., Milwaukee, Wis. This starter is said to incorporate a number of new features such as: reduced voltage starting, thermal overload protection, low voltage protection and renewable silver contacts. It is rated up to 2 hp., 115 or 230 volts. Each starter is supplied with a separate pushbutton master switch providing three-wire remote control. Two-wire control can be furnished if desired.

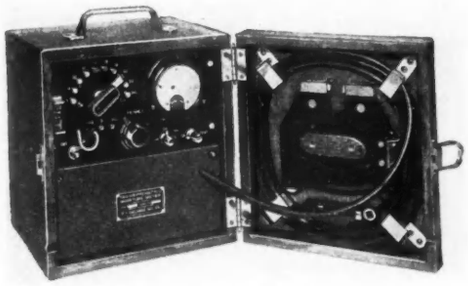
Cutler-Hammer starter

The starter consists of a main line contactor, an accelerating contactor, an armature resistor and the thermal overload relays. On depressing the "start" button of the master switch, the main line contactor connects the motor to the line through the armature resistor. As the motor accelerates to the proper point, the counter E.M.F. of the motor armature closes the accelerating contactor which cuts out the armature resistor, connecting the motor across the line.

Parts, Accessories and Production Tools

Moisture Meter for Lumber

AN instrument for determining the percentage of moisture in woods has been placed on the market by the C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., under the name of the Tag-Heppenstall moisture meter. It is based on the principle of the proportionality of moisture content and electrical conductivity in wood.



Tag-Heppenstall moisture meter

Originally the instrument was developed for use on West Coast soft woods, but investigation is said to have shown that with few exceptions electrical conductivity accurately measures moisture content.

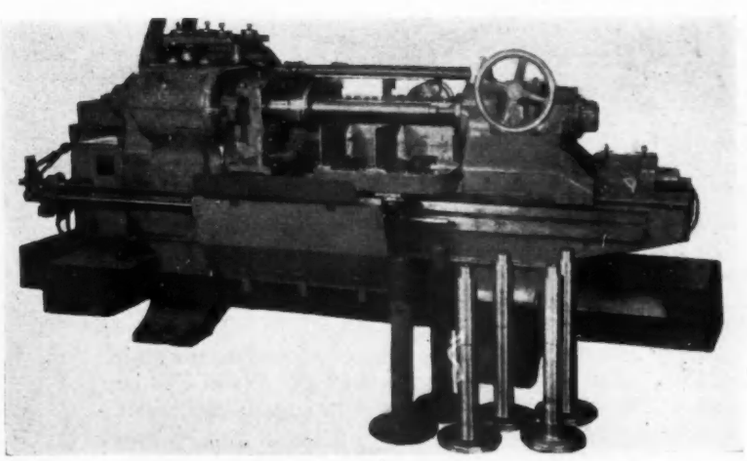
The moisture meter consists of the case to which the testing handle is connected by 10 ft. of flexible cable. The testing handle is fitted with double needle contacts for penetrating the wood and a small electric lamp used when sorting out wet stock. On the panel of the instrument will be seen the milliammeter, the control switches and the selector switch which is graduated from 7 to 24 per cent moisture. Dry batteries contained in the case are used for the operation of the instrument. The dimensions of the case are approximately 10 x 10 x 12 in. high and the total weight is about 20 lb.

Lathe for Tractor Axles

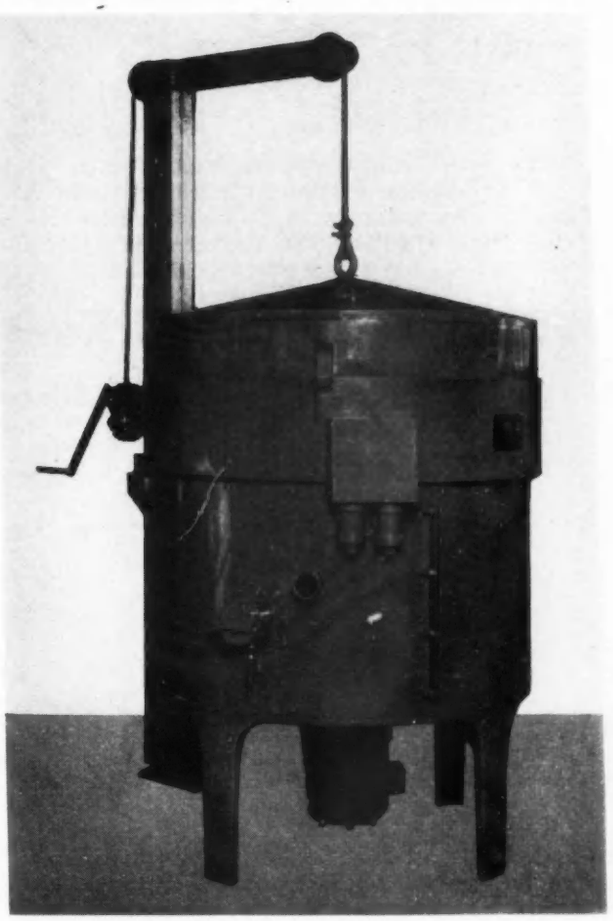
A SPECIAL lathe for turning tractor axles has been built by the Foster Machine Co. of Elkhart, Ind. It is simple in design and is provided with a roller-bearing spindle and roller bearings on the tail center.

Two cutter slides mounted on a platen comprise the tool carrying units. One slide is provided with a cross feeding movement for straddle-facing the flange. The second slide is provided with a slight cross feeding movement for backing the cutters clear of the work on completion of all operations, and before the tooling is returned to the starting position. The longitudinal feeding movement of the latter slide is effected through movement of the platen. Turning cuts are divided in short lengths by the multiple-tooling method.

The axle is 26 in. long in the rough and 3¼ in. in diameter, while the flange on it is 10 in. in diameter and ¾ in. wide. During test runs all turning operations were completed in 4½ minutes.



Foster special lathe for turning tractor axles



Leeds & Northrup nitriding furnace

Homo Nitriding Furnace

THE Homo nitriding furnace is the latest development in heat-treating equipment made by the Leeds & Northrup Co., Philadelphia, Pa.

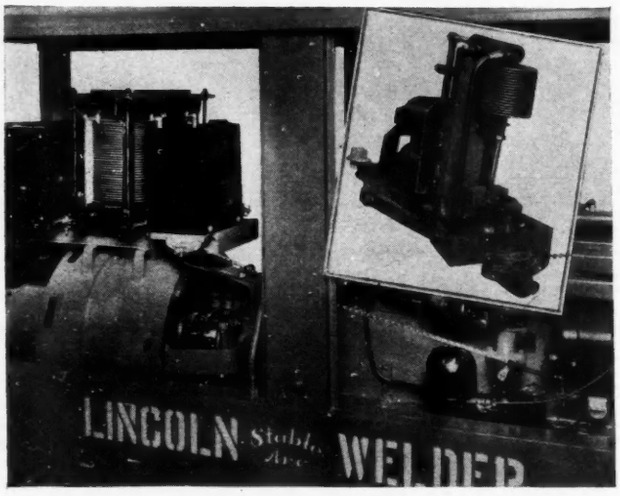
This furnace applies to nitriding the Homo principle of forced, automatically-reversed connection. It drives

ammonia through the load as a Homo drives air. All factors that affect the furnace are controlled so that the user can duplicate the nitriding of any batch.

The furnace shell is gas-tight with sealed top, bottom and center. Special materials are used throughout because the usual metals disintegrate rapidly when in constant contact with hot ammonia gas.

Lincoln Idling Device

AN automatic idling device for regulating the speed of the gasoline engine in Lincoln "Stable Arc" welders has been perfected by The Lincoln Electric Co., Cleveland, Ohio. The new device automatically increases the speed of the engine from normal idling speed to governed speed for welding service whenever the arc is struck. When welding is discontinued, the device again reduces engine speed to the normal idling speed.



Stable Arc welder with idling device (insert)

The operating mechanism of this device consists mainly of a small metal bellows and an electro-magnet. When the arc is struck, the armature of the electro-magnet opens a relief valve in the bellows, causing them to inflate and in turn allow a coil spring to open the engine throttle. When the welding operation ceases, the bellows are deflated by suction of the engine intake, which brings the engine throttle back to its idling position. The idling device is provided with a control lever which may be set for automatic throttle control for continuous idling or for governed speed.

Solders for Silver Brazing

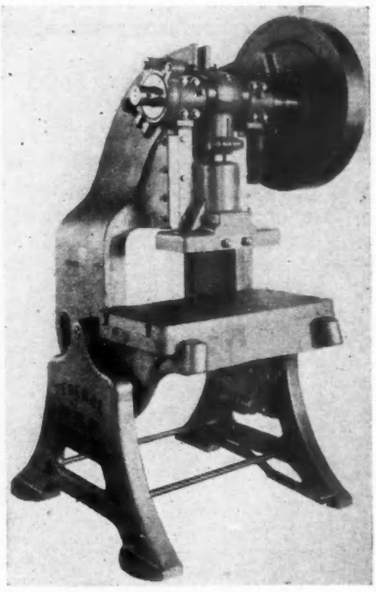
A STANDARDIZED series of silver solders containing from 10 to 80 per cent silver is now available under the trade name "Handy," produced in sheet, strip, wire and filings by Handy & Harmon, 57 William St., New York City.

These solders have a melting point ranging from 1325 deg. to 1600 deg. Fahr., depending upon the percentage of silver that they contain, and are said to produce joints having a tensile strength ranging from 40,000 to 60,000 lb. per sq. in. They are said to flow freely, penetrate tight-fitting joints and to possess malleability. For automotive work they are claimed to be particularly adaptable to brazing joints and connections on oil lines and other copper and brass parts. These compositions are designed for brazing nickel, monel-metal, stainless steel and iron.

Inclinable Punch Press

THE Federal Press Co., Elkhart, Ind., has introduced the No. 33 inclinable punch press designed for high-speed production on large, light section stampings.

It provides a large die space and bed area to accommodate long progressive dies. Motor power is about 2 hp. at 125 r.p.m. of flywheel. Floor space required is 38½ in. by 44¾ in. Net weight of machine, 3100 lb.



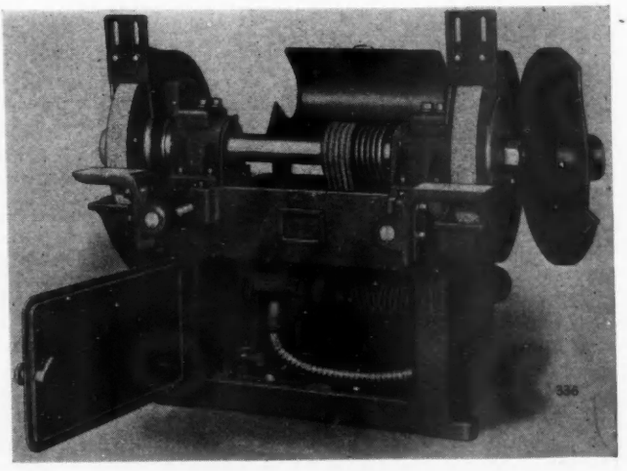
Federal Punch Press

High-Speed Snagging Grinders

A NEW high-speed grinder for snagging operations utilizing high-speed grinding wheels, has been announced by the Hisey-Wolf Machine Co., Cincinnati, Ohio. It is available in a single-speed type and multi-speed type.

These grinders are equipped with a Texrope drive which, in the case of the multi-speed machine shown, permits quick changes in speed ratio. Wheel guards of heavy boiler plate are provided. A chip breaker and a safety device controlling adjustment are linked with the wheel guard and are controlled by its movement.

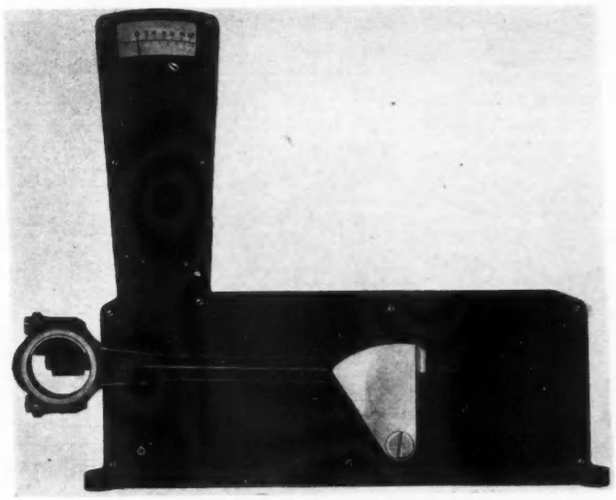
The single-speed machine is built in three sizes as follows: 18 in., 20 in. and 24 in., diameter of wheel, and driven by 5, 7½ and 10 hp. motors respectively. The multi-speed machine is designed for a 24-in. wheel and is equipped with a 10 hp. motor.



Hisey-Wolf grinder for snagging operations

Automatic Computing Scale

AN automatic computing scale for weighing connecting rods has been announced by the Standard Computing Scale Co., Detroit, Mich. This scale is preset to the desired connecting rod weight and when the



Scale for weighing connecting rods

rod is placed on the scale, the weight indicated is the plus or minus variation. Sensitivity to less than ½ gram is claimed. It is equipped with a lever locking device insuring it against rough usage and eliminating indicator variation for faster weighing. Bearings are agate with hardened steel pivots, four being used in the scale. Means are provided for adjusting the scale to meet any requirements occasioned by a change in design or weight of the connecting rod.

Drive-Stud

The Drive-Stud, made by the Groov-Pin Corp., as a substitute for screws, bolts, etc.

THE Drive-Stud is a new addition to the products made by the Groov-Pin Corp., Long Island City, N. Y.

It is designed as a substitute for machine screws, bolts, escutcheon pins, etc. The Drive-Stud is made of cold drawn alloy steel with three gradually widening longitudinal grooves in the shank. The point of the stud is the size of the drilled hole and when driven in, the elastic segments are pressed in to make a locking contact. Drive-Studs are made in 30 stock sizes ranging from 0.052 in. to 0.221 in. diameter and ⅛ in. to ¾ in. in length.

Footlift Truck

A NEW lift truck for loads up to 3500 lb., is announced by the Lewis-Shepard Co., Watertown Station, Boston, Mass.

Lewis-Shepard Footlift truck

The Footlift is designed to operate entirely by foot. The handle has no connection with the lift mechanism and is used only for hauling and steering. Special features of construction are: a vertical release check, Alemite push type lubrication and double locking mechanism. This truck is available in a wide variety of platform heights and sizes, the Model NA being made in 12 combinations, the Model WA in 11.

Apex Friction Chuck

Apex friction chuck

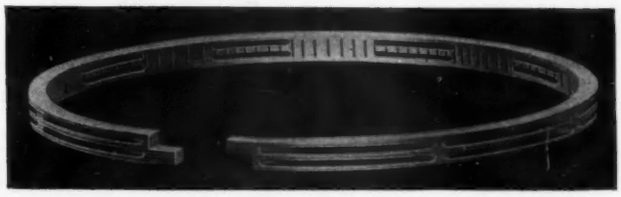
THE multiple disk safety friction chuck, manufactured by the Apex Machine Co., Dayton, Ohio, is now being furnished with a shank to fit any electric or air tool and with a hole in the bottom to take any make of socket wrench, screw driver bit, etc. The photo shows the friction chuck with hexagon shank and hexagon hole in the bottom. When the friction is set to the desired tension, a uniform setting is obtained.

Nut setters made of alloy steel, stud setters with alloy steel sleeves and screw driver bits are furnished with shanks to fit any make of electric or air tool.

Double Vent Oil Ring

RECENTLY the American Hammered Piston Ring Co. of Baltimore, Md., introduced a double vent oil ring designed for use in high speed motors or where excessive oil consumption occurs.

The double vent oil ring is hammered to obtain uni-



Double vent oil ring developed by American Hammered Piston Ring Co.

form and lasting tension, while a series of parallel slots are cut through the ring to permit the draining of excessive oil back to the crankcase. Double drainage has been combined with great strength by designing the slots with rounded corners.

The ring is installed in the lowest groove on the piston except when there is a groove on the skirt of the piston and then it is installed in the groove directly above the piston pin.

First with the News

Reliable, Accurate

News of the Industry

PAGE 808 VOLUME 61 *Philadelphia, Saturday, November 30, 1929* NUMBER 22

New Models Are Cynosure While Factories Tool-Up

PHILADELPHIA, Nov. 30—With many automobile plants shut down for inventory and a number of others devoting a large part of their attention toward getting new models into production, it is doubtful if the total passenger car and truck production for the United States and Canada this month will equal that of November, 1928, when 268,909 passenger cars and trucks were turned out. Meanwhile, the center of attention has shifted to 1930 models to come, partly because of the extensive tooling-up that is under way in many automotive plants.

Statements from leaders in the automobile world affirming the soundness of the industry and business conditions generally continue to be received by *Automotive Industries*.

"I have never known a time when general business conditions were on a more sound footing than now," says a statement from C. W. Nash, President of the Nash Motors Co. "The indications are that we will have cheaper money in 1930, and, when those who have been intoxicated with speculation have sobered up, business will go along in a normal way. I am willing to admit that in some sections of the country, on account of everybody being upset, the automobile business is suffering a little. In other parts, however, our sales are running ahead of last year at this time."

"Motor car production has been, with normal variations, consistently upward for the last thirty years," says a statement from Walter P. Chrysler, president of the Chrysler Corp. "Adjustment of automobile production from time to time to temporary economic conditions simply accords with good industrial practice. The industry's long term outlook is healthier for these adjustments. Meanwhile improvements in manufacture and distribution, application of principles of mass quality production, and consolidation of important manufacturing units have given the industry strength and stability greater today than ever before."

British Exports Financed

LONDON, Nov. 25—Announcement has been made that the Prudential Assurance Co., Ltd., one of the largest insurance concerns in England, has agreed to advance the sum of £1,000,000 for the merchandising of British motor cars overseas in order to compete with foreign makers.

New York Packard Sees No Depression

NEW YORK, Nov. 26—Packard Motor Car Co. of New York sold 288 new cars between the period Oct. 24 and Nov. 15, according to a statement issued by Lee J. Eastman, president of this company and a vice-president of the parent company in Detroit. He cites these figures to show that reports of business depression following the stock market break are extremely exaggerated. Adding this figure to 736 unfilled orders as of Oct. 24 shows a total of 1024 orders during the period. There were 38 cancellations, of which only 20 are attributed to stock market conditions.

Mercer Motors Corp. is Chartered in Dover

DOVER, DEL., Nov. 26—The Mercer Motors Corp. has filed papers with the Secretary of State here and a charter was issued as of Nov. 21. Capitalization is listed as consisting of 400,000 shares of no par value. The Delaware agent for the corporation is Prentice-Hall, Inc., of Dover.

The corporation is the outgrowth of a group which was formed several months ago, and purchased the patents and good-will of the Mercer Automobile Co., which manufactured the Mercer car in Trenton, N. J., and ceased manufacturing in 1925, after having built upwards of 25,000 four and six-cylinder cars.

Reeves Sees Demand for Cars Continuing

Predicts Active 1930 Based on Projects Already Announced

DETROIT, Nov. 26—Expenditure of $1,500,000,000 for highways in addition to city improvements, plus the commitments by railroad heads is an indication that transportation will continue to lead America's march of business, according to Alfred Reeves, general manager of the National Automobile Chamber of Commerce, who is in Detroit visiting automobile factories.

"Wherever there is road space there will be demand for motor cars," said Mr. Reeves. "That has been the continuous history of highway development in this country. Highway building is going forward at the rate of 40,000 to 50,000 miles per year, and the action of President Hoover in the encouragement of public works will give a stimulus to the movement in the coming 12 months.

"Just as the agreement of the rail heads to put in heavy orders for rolling stock guarantees a wide range of employment, so the construction of highways by Federal and local authorities means extensive payrolls and healthy business activity.

"The calm and undisturbed attitude of automobile executives during the recent financial disturbance is an indication of the sound conditions which are the basis of the motor business. There are something like 25,000,000 vehicles in use in the United States, calling for replacements of around 3,000,000 annually. In addition to this, there is an export market of 1,000,000 cars. Given this fundamental business of 4,000,000 vehicles a year, plus the gain to be realized from additional highways, growth in population, suburban development and the like, the industry looks forward to an active year."

Marmon Promotes Moore

INDIANAPOLIS, Nov. 27—Announcement of the appointment of Nicholas Moore as advertising manager of the Marmon Motor Car Co., has been made by T. E. Jarrard, general sales manager. The appointment becomes effective Dec. 1. Mr. Moore has been publicity supervisor previously.

Sales Executives Discuss 1930 Plans

Dealers' Requirements Outlined by National Manager at N.A.C.C. Session

DETROIT, Nov. 26—Plans for the coming automobile shows, the present problems of distribution and the outlook for 1930, were considered by the sales managers' committee of the National Automobile Chamber of Commerce today. It was decided to secure additional statistics from the sales field, with a view to more balanced production schedules in the interests of both the dealers and manufacturers.

Many new things will be shown for the first time at the New York Automobile Show, it was indicated, when the exhibit opens Jan. 4 in Grand Central Palace. Selling organizations are planning for aggressive advertising and merchandising activities at all the announced shows.

Warren E. Griffith, president, and C. A. Vane, general manager of the National Automobile Dealers' Association, were invited to outline the dealers' and distributors' requirements during the coming year.

Members of the N.A.C.C. sales committee in attendance were R. H. Grant, General Motors Corp., chairman of the meeting; Joseph E. Field, Chrysler Corp.; Paul G. Hoffman, Studebaker; H. W. Peters, Packard, and Courtney Johnson, Hudson. Among others who attended the session were Robert C. Graham, Graham-Paige, and H. H. Rice, General Motors Corp., who are directors of the chamber, and Alfred Reeves, general manager.

This was the third of a series of meetings to discuss selling problems of the industry. Another one is to be held next month.

Brownback Leaves Motor Laboratories

NORRISTOWN, PA., Nov. 26 — H. L. Brownback, vice-president of the Brownback Motor Laboratories, Inc., New York, announced today that he has resigned as engineering director of the laboratories and will engage in independent research on aircraft engines. His stock interest in the laboratories will be retained and he will continue as vice-president, according to the announcement.

Tires and Sundries Production is Steady

NEW YORK, Nov. 26 — Tires and tire sundries were produced during the third quarter of 1929 with a value of $205,099,000, according to statistics compiled by the Rubber Manufacturers Association from its third quarter questionnaire. This compares with $235,657,000 for the corresponding quarter a year ago and with $200,874,000 for the second quarter of the current year. This is also out of a total of all rubber products valued at $300,189,000. There were consumed in this tire production 87,060 long tons of crude rubber out of a total of 104,646 long tons consumed by the entire industry for the quarter.

Ford Mexican Plant Raises Wages

MEXICO CITY, Nov. 25 — Adrian Rene Lajous, Ford Motor Co. local representative, announces that wages of Ford Motor Co. of Mexico employees now receiving from six to nine pesos daily will be raised to seven pesos 20 centavos to 12 pesos daily. Apprentices who earn two pesos 50 centavos daily, during their first 800 working hours, will be paid three pesos daily, during their first 600 working hours. New wage scale becomes effective December 1.

Linn Trailer Corp. Formed

ONEONTA, N. Y., Nov. 26 — Announcement has been made of the formation of the Linn Trailer Corp., with a capitalization of $100,000. A steel and brick building 50 ft. by 150 ft. has been completed and production of trailers ranging from the light passenger car type to heavy truck types will be begun immediately, according to the announcement. Directors of the corporation are: H. H. Linn, president; E. W. Wheeler, vice-president; C. J. Smith, treasurer, and H. W. Naylor, secretary.

Peabody Gets G. M. Post

NEW YORK, Nov. 26—F. D. Peabody, former sales manager of New Era Motors, has been appointed sales manager for General Motors Argentina, and sails for Buenos Aires Nov. 30 on the S.S. American Legion.

Favorable Export Rates to Continue

N.A.C.C. Group Meets to Consider Renewing Shipping Contracts

NEW YORK, Nov. 25—General continuation of favorable steamship freight rates established at the beginning of the year, with somewhat lower figures in some cases, seems assured on the basis of reports presented at the meeting of the Export Rate Committee of the National Automobile Chamber of Commerce in Detroit last week.

The committee had for consideration renewal of shipping contracts with the United Kingdom, Transcontinental, Austrian, South American and Far Eastern conferences for the year 1930. The question of shipping unboxed automobiles to the eastern coast of South America was also considered at this meeting.

W. L. Mitchell, chairman of the board, and E. C. Morse, president Chrysler Export Corp., addressed the meeting, stressing the importance of the committee's work and the necessity of lowest possible delivered cost for American cars in the world's markets.

Coincidentally, the Transcontinental Rate Committee met and discussed the possibility of handling unboxed automobiles through Pacific Coast ports and the rate and classification of a number of automobile parts used in the domestic trade in the territory west of the Rocky Mountains.

To Finance Plane Sales

CHICAGO, Nov. 25—Financing of airplane sales on the instalment plan, following closely along the lines characterizing such distribution in the motor industry, was announced yesterday by Arthur Greene, president of Merchants & Manufacturers Securities Company.

Financial Notes

Company	Announces
Bastian-Blessing Co.	net fiscal year earnings est. $600,000 after all chgs., incl. fed. taxes
Bohn Aluminum & Brass	reg. quar. div., $1.75, pref., Jan. 2. Record Dec. 20
Borg-Warner Corp.	10 mos. earn. $6,826,121 aft. all chgs., equals 5.38 a share on common
Budd Wheel Co.	9 mos. net income $1,706,160, or $7.10 a share
Brockway Motor Truck Corp.	reg. quar. div. of $1.75 on pref.
Chicago Yellow Cab	9 mos. net income $1,762,578 after all charges. Equals $4.40 a share, compared with $3.49 for same period 1928
Comm. Invest. Trust, Inc.	signed contract with Detroit Aircraft Co. for financing sales
Curtiss Aeroplane & Motor	9 mos. net earnings $1,371,012 aft. all chgs., equal to $3.93 a share, compares with $2.08 for same period 1928
Elec. Stor. Batt. Co.	quar. div. $1.25 on com. and pref.
Fageol Motors of Cal.	9 mos. profit $280,579, after chgs., bef. fed. taxes 9 mos. 1928 $221,650 after chgs., bef. fed taxes
Hydraulic Brake Asso., Ltd.	applied for listing shares on Los Angeles Exchange
Moto-Meter Gage & Equip.	net quar. earnings 27c share
Nat. Auto. Fibres, Inc.	6 mos. net profit 44c on common stock after $7 on no par preferred outstanding
Raybestos-Manhattan Co.	9 mos. earnings $3,108,919 aft. all chgs., equals $4.60 a share; compares with $3.12 a share for same period 1928; init. quar. div. 65c a share declared, placing stock on $2.60 annual basis
Rolls-Royce of Amer.	9 mos. earnings $365,000 aft. bond int. and taxes, equal to $10 a share
Sparta Foundry	reg. quar. div. of 75c; ex. div. 50c; stock div. 25 per cent
Winton Engine Co.	10 mos. net profit $747,390 aft. depr. & fed. taxes, equals $10.05 per share com., after $3 per share pref.

Men of the Industry and What They Are Doing

Raymond P. Fohey
Appointed Chrysler Corp. secretary

Donaldson Made Manager

David Donaldson, formerly a member of the Murray Corp. of America manufacturing staff, has been appointed factory manager of Dietrich, Inc., Murray custom body building subsidiary. He assumes the manufacturing responsibilities formerly held by Alexander Carlson, who resigned from the Dietrich organization Nov. 1.

Oswald is Transferred

R. Z. Oswald, during the past five years district manager for Thompson Products, Inc., in the Atlanta territory, has been transferred to the main plant of the company at Cleveland, according to an announcement by L. M. Clegg, general sales manager. Leonard W. Reeves will fill Oswald's place in the South.

Clarkson Returns From Europe

E. P. Clarkson, formerly managing director of Dodge Brothers of Canada, recently spent some time touring England and on his return stated that British car manufacturers are turning towards Canada and it is likely that they will establish factories there in the near future.

Marmon Appoints Hoffman

Thomas E. Jarrard, general sales director of the Marmon Motor Car Co., has announced the establishment of a used car division with Mortimer Hoffman, a newcomer to the Marmon organization, at its head.

Fohey Succeeds Morrison as Secretary of Chrysler

The Chrysler Corp. has announced the resignation of F. A. Morrison as secretary and the appointment of Raymond P. Fohey, formerly secretary and treasurer of the Dodge Brothers Corp., as his successor. Mr. Morrison, who has been secretary of Chrysler since 1926, will be associated as business executive with the firm of Campbell, Bulkey & Ledyard, Detroit counsel for the Chrysler Corp.

Mr. Morrison had his early business training with the Security Trust Co. of Detroit, having been in the corporate trust department for about eight years. His experience in the automobile business began in 1919, when he became general auditor of Maxwell Motor Co., Inc.

Mr. Fohey brings to his new position a wide knowledge of industrial operation and corporate management. His long experience with the Dodge Brothers' business, now one of the largest and most successful divisions of Chrysler Motors, particularly qualifies him for the secretaryship of the Chrysler Corp., the announcement said.

Marmon Appoints Two

A. G. Avery and C. G. Beeching have been appointed to new positions in the Marmon factory sales organization, according to an announcement by T. E. Jarrard, general sales director of the Marmon Motor Car Co. Mr. Avery has been placed in charge of the New Dealer Division and is succeeded by Mr. Beeching as head of the eastern division of the factory sales department.

Caswell is on Committee

E. L. Caswell, export manager of Thompson Products, Inc., has been appointed a member of the International Trade Committee for 1930 by the National Standard Parts Association, it has been announced from the Thompson office.

F. A. Morrison
Former Chrysler Corp. secretary

Averill Addresses Group

Leon E. Averill, safety engineer for the Packard Motor Car Co., addressed a group of foundry supervisors Nov. 22 at a meeting conducted by the Detroit Industrial Safety Council. Mr. Averill emphasized the need for order and cleanliness in foundries as safety factors. He spoke also of the responsibility of supervisors and foremen and of the advisability of charging compensation costs directly to the departments concerned.

Federal Appoints Wilcox

The appointment of George D. Wilcox to head the newly created Merchandising Department of the Federal Motor Truck Co., Detroit, has been announced by R. W. Ruddon, vice-president and general manager of Federal.

Automotive Leaders at Business Stabilization Conference

Among the business leaders invited to confer with President Hoover were Alfred P. Sloan, Jr. (third from left) and Henry Ford (near center). A session of the conference was held Thursday, Nov. 21

Construction Gains Despite Stock Crash

Automotive Concerns Show Continued Activity in Building

PHILADELPHIA, Nov. 26—Reports from automotive and airplane manufacturing centers indicate that the recent stock market collapse has not reduced construction programs.

None of the previously announced building programs has been affected, and several major plant projects will soon be announced, according to *Automotive Industries* correspondents.

Among the units announced this week were:

J. E. Kelly & William Cain, Yonkers, N. Y., architects, filed plans for $165,000 service and repair garage.

Driver-Harris Co., Harrison, N. J., has begun to develop $350,000 improvement project.

Somerville Auto Body Co., Somerville, Mass., plans $45,000 factory.

Edward G. Budd Co., Philadelphia, has awarded general contracts to Wark Co. for $20,000 manufacturing unit.

Coatesville, Pa., Chamber of Commerce has authorized expenditure of $75,000 for airport, hangars, shop, etc.

Norfolk Radiator Co., Norfolk, Va., has awarded contract to Nichols & Lindemann for $30,000 automobile radiator plant.

Clarksburg, W. Va., Aviation Committee, Chamber of Commerce, studying plans for $75,000 airport.

American Forging & Socket Co., Detroit, considering $125,000 plant.

Checker Cab Co., Kalamazoo, Mich., soon to begin construction of $350,000 addition.

Wood Hydraulic Hoist & Body Co., Detroit, awarded contract for $70,000 addition.

Lakey Foundry & Machine Co., Muskegon, considering plans to rebuild part of plant.

O. L. Anderson Co., Inc., Detroit, automobile stampings, contemplating $70,000 addition.

Briggs Commercial & Development Co., Detroit, planning repair garage at Pontiac, Mich., to cost $100,000 and another unit in Detroit to cost $125,000 with equipment.

Allis Chalmers Mfg. Co., West Allis, Wis., plans $135,000 tractor plant in Springfield, Ill.

City of Cleveland has awarded contract to Gilchrist Construction Co. for $100,000 municipal repair and service garage.

B. F. Goodrich Co., Akron, announced plans for spending $250,000 in additional manufacturing facilities in Los Angeles will be undertaken.

Columbia Metal & Die Stamping Co., Cleveland, will install about $65,000 worth of machinery in new building for automobile stamping production.

Wood Bros., Inc., Kansas City, Mo., will take bids soon for $300,000 airplane assembly plant at Rosecrans Airport, St. Joseph, Mo. C. A. Smith, Kansas City, architect.

Southern Air Service, Tulsa, Okla., will erect parts manufacturing and assembly unit for airplane construction as branch of Nicholas-Beazley Corp., Marshall, Mo.

William Powell Co., Cincinnati, (valves, etc.) planning $55,000 plant. Teitig & Lee, architects.

International Harvester Co., Chicago, plans factory branch construction at Sweetwater, Tex., to cost $100,000 with equipment.

Aeronautical Corp., San Diego, plans $125,000 airplane manufacturing plant.

Tax Cases Dismissed

WASHINGTON, Nov. 25—The Supreme Court of the United States today dismissed appeals in two cases from the District Court for the Northern District of California.

Williams, et al., v. Riley, No. 12, questioned the validity of the California motor vehicle fuel tax on the ground that the proceeds were used to support public highways when those highways are aided by Federal legislation which provides that no "toll" shall be charged for the use of them.

Bekins Van Lines, Inc., et al., v. Riley, No. 13, questioned the validity of the gross receipts tax imposed upon freight-carrying motor vehicles operating for hire along public highways and between fixed termini and over regular routes in California.

Salon Opens Dec. 1

NEW YORK, Nov. 25—There will be 18 European and American high priced chassis on exhibition at the Automobile Salon when it opens at the Hotel Commodore at eight o'clock Sunday evening, Dec. 1. This is the silver anniversary of this exhibit and six nations will be represented, France, Italy, Belgium, Germany, England and the United States. There will be 17 American custom body builders represented, two custom body builders from abroad and five European carrossiers.

New Chrysler Tower

The New Chrysler Building at Lexington Ave. and 42nd St., New York, has office space to the 845 ft. level, and with the addition of the vertex (ornamental spire and cap), becomes the tallest structure in the world

Budd Wheel Changes Plant

DETROIT, Nov. 26—The Budd Wheel Co. has undertaken a complete rearrangement of its Detroit plant. This has made available approximately 25,000 sq. ft. in the former wheel building which has now become the Budd engineering building and will house the inspection, tool design, wheel engineering, body engineering, laboratory and wheel experimental departments, in addition to an engineering display room.

F. P. Mullins Resigns

DETROIT, Nov. 25—F. P. Mullins, who has been vice-president, secretary and treasurer of the Mullins Manufacturing Co., announced his resignation from the firm. He has accepted a partnership in the A. E. Masten & Co., investment brokers in Pittsburgh.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES.

NEW YORK, Nov. 27—Retail trade in seasonal goods last week improved with the colder weather. Wholesale and jobbing sales fell off. While there have not been any wide-scale indications so far of general business depression resulting from the crash on the stock market, retail sales of some lines of luxury goods have been adversely affected.

LIFE INSURANCE SALES

Sales of ordinary life insurance during October were 4 per cent above those in the corresponding month last year, while those during the first 10 months of the year were 8 per cent above those in the corresponding period last year.

CONSTRUCTION CONTRACTS

Construction contracts awarded during October in 37 eastern States, according to F. W. Dodge Corporation, amounted to $445,642,300, which marks a slight increase above those in the preceding month, although a decline of 25 per cent below those a year ago.

CRUDE OIL PRODUCTION

Average daily crude oil production for the week ended Nov. 16 amounted to 2,620,000 barrels, as compared with 8,631,200 barrels for the preceding week and 2,490,850 barrels a year ago.

FREIGHT CAR LOADINGS

Railway freight loadings for the week ended Nov. 9 totaled 1,049,475 cars, which marks a decrease of 4,878 cars below those in the corresponding week last year but an increase of 74,341 cars above those in the corresponding week two years ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Nov. 23 stood at 92.2, a new low for the year, as compared with 92.6 the week before and 93.3 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended Nov. 20 were 7 per cent above those in the corresponding week last year.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended November 20 showed decreases of $71,800,000 in holdings of discounted bills, of $15,700,000 in holdings of bills bought in the open market, and of $89,800,000 in member bank reserve deposits. There was an increase of $14,000,000 in holdings of Government securities. The reserve ratio on Nov. 20 was 71.2 per cent, as compared with 69.5 per cent a week earlier and 68.4 per cent a year earlier. Last week the Federal Reserve Bank of Chicago reduced its rediscount rate from 5 to 4½ per cent.

Steel Mills Receive Favorable Inquiries

Stability is Keynote as Increased Automotive Demand Seems Certain

NEW YORK, Nov. 27—Specifications for sheets and strip-steel from automotive consumers are coming out in somewhat more encouraging volume, and although tonnages involved so far do not justify any marked stepping-up in the rate of operations, the trend is in an upward direction. One of the Mahoning Valley independents has been able to go on a schedule entailing better activity than at any time since early in October.

Inquiry for body and fender stock is indicative of a gradual resumption of more normal operations by body and parts manufacturers. It is generally thought that the taking of inventories will be out of the way in most automotive plants by the middle of December, and that a general increase in orders may be looked for from now on. The enlarged building program for 1930 is looked to by steel producers to steady prices rather than to enhance them.

Stabilization is the keynote of the policy which dominates the steel industry, and it was with this in mind that the head of one of the larger independents announced a few days ago that there would be no downward revision of wage scales. This program of stabilization is fully reflected in the price situation. First quarter 1930 prices have been announced all around as unchanged from those now prevailing.

Strip-steel producers, whose volume has shrunk probably more than that of any other description of steel, are holding fast to current quotations on both hot and cold-rolled. Fender stock is quoted generally at 4.25 cents, Pittsburgh, and while producers are more than eager for orders, they refrain from price-shading. There is certain to be spirited competition for orders when a greater volume of business comes into sight, but the industry's program of maintaining the market on an even keel is likely to act as a brake on price concessions.

Pig Iron—While there has been no appreciable increase so far in buying by automotive foundries, more inquiries are being received. A very optimistic feeling prevails. In none of the markets have price changes been announced.

Aluminum—The market is quiet and unchanged. Some consumers of remelted metal are slowly starting to cover part of their first quarter 1930 requirements. Consumers' stocks are very low, and as soon as foundries begin to operate more actively, demand for prompt shipments is expected to quicken.

Copper—Although the market opened the week with the producers' price continuing pegged at 18 cents, which has been in effect since the middle of April, the "outside" market was ¼ @ ½ cent lower, resulting in unsettlement.

Tin—Under the leadership of the London market, the price of tin moved to higher levels this week, 42 @ 42½ cents being quoted for Straits, according to delivery month. The large Malay States and Nigeria producers are reported to have reached an agreement to curtail output 10 per cent.

Lead—Quiet and unchanged.

Zinc—Consumers are buying from hand to mouth. Low prices abroad make for irregularity here. Ore output is being further curtailed.

Cadillac-LaSalle Prices Increased

DETROIT, Nov. 27 — Cadillac and LaSalle prices have been increased, effective Dec. 1, from $100 to $200 on LaSalle models, and from $100 to $300 on Cadillac models. The increase in Cadillac and LaSalle prices is a return to about the same list prices which prevailed during the past year, according to a statement by Lawrence P. Fisher, president of the Cadillac Motor Car Co.

"Current prices have been adjusted to conform with increased cost in producing the new Cadillac and LaSalle cars which were introduced this fall. It is the policy of the company to build cars of the highest quality and to improve upon the policy from time to time as conditions will permit. It is our belief that added value to both Cadillac and LaSalle cars is far more important than the addition of prices."

According to Mr. Fisher there should be no overproduction of automobiles now in effect in the industry.

Soviet Union Imports of U. S. Tractors Rise

PHILADELPHIA, Nov. 26—During the coming fiscal year 1929-30 the importation of farm tractors from the United States into the Soviet Union will be approximately 3.5 times as large as last year. The Selkhosimport Co. has placed orders for 14,080 tractors in this country, of which 9332 have been ordered from the International Harvester Co. and 208 are Farmall tractors.

Two makes of American tractors will make their first appearance in the country of the Soviets next year, namely, the John Deere, of which 1650 have been ordered, and the Massey-Harris or Wallis, of which 702 will be imported. In addition, there have been purchased for the operations of the Government 1354 large Caterpillar tractors and 722 Cletrac tractors, which will be used in agriculture and forestry enterprises.

Of the total number of tractors ordered by the Selkhosimport Co., 1890 had been received in October.

Franklin Car Makes Record

SYRACUSE, Nov. 26—Driving a Franklin sedan, "Cannonball" Baker, test driver of the Franklin Automobile Co., lowered the transcontinental speed record by 4 hr. 29 min., covering the route between New York and Los Angeles in 69 hr. 31 min., according to an announcement made here today.

Noblitt Industries Increase Capital

Stockholders Vote Addition of 75,000 Shares to Stock at Special Meeting

CHICAGO, Nov. 26—A stock dividend of 6 per cent for one year, payable in quarterly instalments at the same time that the regular cash dividends of 75 cents are paid, and an increase in the authorized capital to 150,000 shares from 75,000 shares, were voted by the stockholders of Noblitt-Sparks Industries at a special meeting yesterday. The next quarterly dividend will be paid on Jan. 2 to stockholders of record as of Dec. 20.

During the 10 months ended Oct. 31 the company earned $8.02 a share on the capital stock after all charges, including Federal taxes, as compared with $4.91 a share during the year ended Dec. 31, 1928.

The board of directors was increased from five to nine members. Resignations of Mrs. F. H. Sparks and Mrs. O. G. Noblitt were accepted, and D. S. Lenfesty, Harlan Foulk, Glenn W. Thompson, Fred E. Daniels, J. Clifford Noblitt and D. F. Hamilton were elected directors.

The company was incorporated in 1921 as the Indianapolis Pump & Tube Co., and the name was changed to the present title in 1927. The products are chiefly automobile heaters, tire pumps, jacks and tube products. Plants are located at Seymour and Columbus, Ind.

A.S.M.E. Meeting to Open

NEW YORK, Nov. 27—The annual meeting of the American Society of Mechanical Engineers, featuring simultaneous sessions on machine shop practice, management, applied mechanics and other engineering topics, will open Dec. 2 and continue with morning and afternoon sessions throughout the week. The annual power show at the Grand Central Palace will again be held concurrently with the A.S.M.E. meeting, continuing until Dec. 7.

Buschmann is Replaced

BERLIN, Nov. 11 *(Special)*—The director of the Association of German Automobile Manufacturers, Johannes Buschmann, has been retired from service because of alleged fraudulent conversion of funds belonging to the association. Drs. Reuss and Fishbach have been appointed to direct the association's affairs.

Auburn Shipments Gain

AUBURN, IND., Nov. 26—During the first eleven months of its fiscal year, to Oct. 31, the Auburn Automobile Co. reports shipments of 22,861, a gains of 77 per cent over the 12,899 cars shipped in the entire 1928 fiscal year.

Exports, Imports and Reimports of the Automotive Industry for October of Current Year, and Total for Ten Months Ending October, 1929

	Month of October				Ten Months Ending October			
	1928		1929		1928		1929	
	Number	Value	Number	Value	Number	Value	Number	Value
EXPORTS								
Automobiles, parts and accessories	..	$48,951,482	..	$32,797,056	..	$421,931,958	..	$488,180,510
Electric trucks and passenger cars	..	..	7	12,395	96	117,323	132	199,434
Motor trucks and buses, except electric (total)	16,573	10,087,425	11,512	7,090,787	112,564	74,978,902	173,964	98,572,414
Up to 1 ton, inclusive	12,488	5,547,312	8,282	3,658,000	84,470	41,980,672	133,236	57,887,695
Over 1 and up to 2½ tons	3,765	3,677,603	2,877	2,673,449	25,420	26,356,588	37,740	33,104,246
Over 2½ tons	320	862,510	353	759,338	12,674	6,641,642	2,988	7,580,473
PASSENGER CARS								
Passenger cars, except electric (total)	29,951	21,897,503	20,931	14,468,822	317,699	225,119,073	312,683	213,584,136
Low price range, $1.000 inclusive	20,820	10,605,451	14,620	7,060,789	247,142	132,911,549	237,381	120,911,507
Medium price range, $1.000 up to $2,000	8,092	8,833,461	5,602	5,763,245	61,063	68,974,420	66,436	71,543,217
High price range, over $2,000	1,039	2,387,736	709	1,644,788	9,494	23,233,104	8,866	21,129,412
PARTS, ETC.								
Parts, except engines and tires	..	..	..	..	..	..	..	..
Automobile unit assemblies	..	6,061,677	..	5,729,804	..	53,685,136	..	99,342,468
Automobile parts for replacement (n. e. s.)	..	9,853,890	..	4,498,652	..	48,438,299	..	58,329,224
Automobile accessories	..	651,551	..	628,356	..	7,682,346	..	8,323,686
Automobile service appliances (n. e. s.)	..	634,001	..	668,596	..	6,003,553	..	6,456,895
Trailers	128	75,449	131	56,535	705	322,779	893	419,366
Airplanes, seaplanes and other aircraft	6	48,323	25	377,924	140	1,527,825	295	4,731,360
Parts of airplanes, except engines and tires	..	74,013	..	159,029	..	1,089,482	..	1,785,544
BICYCLES, ETC.								
Bicycles	265	7,361	362	8,747	4,069	108,681	4,434	116,743
Motorcycles	1,308	304,385	789	177,756	15,985	3,719,817	14,321	3,227,614
Parts and accessories, except tires	..	130,415	..	77,700	..	1,238,684	..	946,005
INTERNAL COMBUSTION ENGINES Stationary and Portable								
Diesel and Semi-Diesel	389	65,776	69	107,421	887	979,668	694	1,015,140
Other stationary and portable:								
Not over 10 hp.	4,136	339,511	3,036	267,646	32,283	2,735,659	31,115	2,712,451
Over 10 hp.	490	203,477	348	218,741	4,472	1,750,700	3,958	2,019,725
Automobile engines for:								
Motor trucks and buses	378	88,347	148	38,074	15,184	1,466,406	7,898	1,104,255
Passenger cars	2,210	311,089	3,180	330,166	99,691	10,444,473	84,022	8,724,893
Tractors	206	78,990	42	23,594	635	210,533	795	267,784
Aircraft	7	44,763	20	94,108	132	491,263	285	1,221,198
Accessories and parts (carburetors)	..	258,936	..	313,399	..	2,998,608	..	3,690,670
IMPORTS								
Automobiles and chassis (dutiable)	59	162,800	108	121,432	431	942,647	633	1,034,887
Other vehicles and parts for them (dutiable)	..	48,486	..	78,196	..	511,515	..	1,628,601
REIMPORTS								
Automobiles (free from duty)	34	30,476	56	80,240	215	238,964	420	537,639

Ford to Confer With Son On Proposed Wage Raise

DETROIT, Nov. 25—Upon his return from Washington last Friday, Henry Ford stated that there was nothing further to add at the time to the announcement he gave out at the capital regarding an increase in wages for Ford employees. Mr. Ford announced that he would confer with his son Edsel on the return of the latter to Detroit, some time within the next few days.

"There is to be no cut in production and none is contemplated," Mr. Ford said.

"The stock market situation has not affected our plans or policies in the least. We are going right ahead on the line indicated in the views which I presented to the President's conference."

The Ford Motor Co. reported last Friday that the combined payrolls of its plants in the Detroit area the day before (Thursday, Nov. 21) numbered 99,169 workers.

Curtiss-Wright Sales Program is Announced

ST. LOUIS, Nov. 25—Believing that the vital need of aviation today is a reorganization of its sales program Walter Beech, president, and Maj. William B. Robertson, vice-president of the newly organized Curtiss-Wright Sales Corp., have set about establishing a Curtiss-Wright sales representative at every airport in the United States.

The company has established into six sales districts, with subdivisions. Each district has a manager, who will travel over his territory by plane, keeping in intimate touch with dealers.

"The sale of airplanes has followed the line of least resistance in the past," Maj. Robertson, president of the Curtiss-Robertson Co., said. "In the future only efficient selling methods, similar to those developed in the automobile industry, will be employed."

Timken Changes Inventory

CANTON, Nov. 25—Anticipating renewed activity in the automobile manufacturing field during December and January, the Timken Roller Bearing Co. has changed its annual inventory schedule and will complete its yearly check of stock before the beginning of next month. Various departments of the plant have suspended production until Dec. 1 for inventory. Heretofore the annual check has been made during December.

Auburn Reports Dealer Stocks

AUBURN, IND., Nov. 25—New Cord and Auburn cars in the hands of Auburn dealers and distributors average less than two and a half cars each, E. L. Cord, president of Auburn, announces. At the same time Cord announced that factory stock of Auburn and Cord cars on hand averages less than one car per dealer.

Pines Making Truck Device

CHICAGO, Nov. 25—Pines Winterfront Co. today announced that a new detachable model of automatic radiator shutter for motor trucks is now in production.

Gardner Says Stock Crash Will Not Touch Car Sales

ST. LOUIS, Nov. 25—"Despite the recent severe reaction in the stock market I cannot visualize the average American citizen going without his automobile," Russell E. Gardner, Jr., president of the Gardner Motor Co., said in discussing the probable effect of the crash of stock values on automobile sales.

"Personal transportation as supplied by the automobile is now a necessity," Mr. Gardner declared. "General opinion indicates that luxuries will suffer as a result of the decrease in the value of securities. I do not feel that the automobile comes under this head, and, in my opinion, the average American will continue to replace his old car with a new one, just as he has done previously."

Oscar L. Anderson

DETROIT, Nov. 25—Oscar L. Anderson, president of O. L. Anderson Co., Inc., of this city, manufacturer of sheet metal parts for automobiles, died here recently after a brief illness. Mr. Anderson, who was 45, founded the company bearing his name in July, 1919.

Limousine Body Co. Adding

KALAMAZOO, MICH., Nov. 25—A program of expansion which will result in increased production facilities of at least 20 per cent is now under way by the Limousine Body Co. of this city, J. D. Bobb, president, announced today. The Limousine company is a subsidiary of Auburn.

Solid Injection Type Oil Engine May Be Ultimate Power for Airships, Says Fulton

WASHINGTON, Nov. 25—Steady progress in the development of oil-burning engines for aircraft is noticeable in the United States, and it is probable that a satisfactory engine of this type will be available for installation in the second of the two dirigibles now under construction for the Navy, it was stated orally, Nov. 21, by the chief of the lighter-than-air division of the Navy's Bureau of Aeronautics, Commander Fulton.

Several companies are experimenting with oil-burning engines for airplanes. Limited tests have been made successfully, it was stated, Nov. 21, at the Department of Commerce.

If a successful type of oil-burning engine can be developed, Commander Fulton pointed out, a long step will have been taken toward increasing safety. The use of the helium, safest known lifting gas, he said, requires the collateral use of the safest type engine, and fire risk from gasoline engines is considered almost as great as the risk from hydrogen.

It appears probable that, even if slightly high in engine weight, the oil-burning engine will prove to be more economical as to fuel required, both in weight of fuel consumed and cost of fuel, in his opinion.

Low fuel consumption is of importance, he said, and while the specific fuel consumption should remain steady over a wide range of power, the fuel consumption is most effective at around two-thirds full power, since this power will be that normally used for cruising. This leads to the suggestion that power plants for airships be compared on the basis of weight of engine plus weight of fuel required for 48 hours at two-thirds rated hp., he stated.

An air-cooled engine might be adapted for installation in an airship, and proposals to this end have been discussed many times, it was stated. One scheme was to mount the engines by retractable means so that the units not required at cruising speeds could be housed.

But from a general standpoint, having in mind the use of helium, it seems more desirable to place the engines inside the hull, Commander Fulton said. Difficulties in engine cooling, unless water or steam cooling is resorted to, appear to exclude air-cooled engines for positions inside the airship's hull, he added.

"These major requirements point at once to an engine of the solid injection type as the ultimate airship engine," he said.

British Makers of Cars Seek Foreign Outlets

LONDON, Nov. 13—The rush of British automobile manufacturers to capture overseas markets, which has already been launched in Australia, New Zealand and South Africa, will shortly be extended to India and subsequently Canada, it is announced today.

India is regarded here as being the stronghold of Britain's foreign competitors, and arrangements are therefore being made to send an important trade mission thither at an early date. They are to open offices for individual activities.

The British makers' new move is instigated by the British section of the Society of Motor Manufacturers and Traders, led by Col. Hacking, director-organizer, who is mainly responsible for the society spending $250,000 on the "British car push."

"We hope to turn our attention to Canada ere long," Hacking said today. "Nothing is yet settled but we are considering the establishment of assembly plants in Canada for some units of the best-made English engines, for example. Body construction is best in Canada.

"One outlet for our cars would be the United States, thus carrying the war into the enemy's trenches," he said. Financing of the new move is to be undertaken by several sources, it was announced in connection with the above statement.

Lammot du Pont Praises Hoover's Business Aids

WILMINGTON, DEL., Nov. 25—Lammot du Pont, president of the du Pont Company, and chairman of the board, General Motors Corp., today declared his belief in the soundness of the plans for business stabilization as outlined by President Hoover.

"President Hoover's conferences have been constructive and helpful," he said, "resulting in getting together facts, exchanging views and defining weaknesses that exist. The beneficial effects will be the elimination of the tendency toward unwarranted steps urged upon the individual through fear and the summation of courage in industrial managers to take only those steps which are constructive and helpful."

A Correction

Automotive Industries wishes to call attention to the fact that the name of M. W. Bourdon, its London correspondent, was inadvertently placed on the article describing the new Sunbeam, 4000 hp. racing car, which appeared in its issue of November 23. The signature should have been that of W. F. Bradley, its Paris correspondent, who obtained the information after others had failed and wrote the article. His description of the new racer, which is to be entered in the Daytona Beach speed trials next March, was the first to be published in the United States.

Toledo Plants Show Healthy Schedules

Return to Normal Following Inventory Periods is Indicated

TOLEDO, Nov. 25—Toledo automotive plants will be back to normal winter operations by Dec. 15 following inventory closing in recent weeks. President L. A. Miller of the Willys-Overland Co., has announced that 7500 workers would be recalled this week and that it would be up to winter production by mid-December with more than 10,000 men employed.

The Chevrolet Motors Ohio Co., opened Nov. 18 after two weeks closing. It is employing about 1500 workers. The Mather Spring Co. also put back 400 men at work on Nov. 18. The Dura Co. expects to be back to regular schedule in three weeks. H. C. Tillotson, president of the Tillotson Mfg. Co., announced his company has just received three large new contracts for carburetors and its plants will be working on regular schedule in about three weeks.

The Electric Auto-Lite Co. looks forward to December production 50 per cent above November and January and about 80 per cent better than present month. New million dollar addition to the plant is being rushed to completion by Jan. 1.

City Machine and Tool Company reported $580,918 profits for 10 months equal to $0.87 a share. Company has night and day schedule well beyond turn of year.

Three hundred distributors and their sales managers completed a two-day conference at Willys-Overland plant last Thursday. Sales plans for beginning of 1930 were discussed in detail and enthusiasm was shown by the distributors. President Miller outlined the company's policy in gaging production to public demand and its protection for dealers. The consensus was that 1930 will be a very satisfactory year.

Mullins Resumes Full Time

SALEM, OHIO, Nov. 25—The Mullins Mfg. Co. will operate at full capacity starting today, giving employment to approximately 500 men, according to an announcement made by company officials. For the past several months the company has been operating at 20 per cent of capacity. The company, which manufactures automobile body parts, has more orders on its books at the present time than it has had in the history of the organization.

Chrysler Adds Model

DETROIT, Nov. 25—The addition of a convertible coupe on the Chrysler "70" chassis has been announced by J. W. Frazer, general sales manager of the Chrysler Sales Corp. With this model now in production the line includes seven body styles.

Moon Gets Ruxton Through Stock Deal

Announces Plans for Quantity Production of Front-Drive Models

ST. LOUIS, Nov. 25—The Moon Motor Car Co. announced today the acquisition of the New Era Motors, Inc., owner of the Ruxton front-wheel drive automobile, and will take over its production from the Gardner Motor Co., which has been manufacturing it on a contractual basis. The deal was effected through an exchange of stock, and additional financing through the issuance of treasury shares has been underwritten.

C. W. Burst, president of the Moon Co., said that quantity production of the Ruxton will begin immediately at the St. Louis plant of the Moon Co., and that it will be distributed through the Moon dealer organization.

By means of quantity production at the Moon plants, Mr. Burst said, the price range will be lowered, and light eights and sixes will be turned out. Hitherto the Ruxton has appeared only as an eight-cylinder car and has been priced to appeal to a comparatively limited class.

Walker Confirms Purchase

CHICAGO, Nov. 25—Purchase of the Ruxton front-drive automobile patents by the Moon Motor Car Co. of St. Louis, was confirmed in St. Louis today by Helm Walker, sales manager of Moon and the Windsor Corp. Mr. Walker said it was the intention of Moon to manufacture and market the Ruxton in connection with the Windsor automobile line.

The transaction also includes the acquisition, through exchange of stock, of all plant equipment of New Era Motors, Inc., the developers of the Ruxton car. Additional financing through new stock issues is said to have already been underwritten.

Crude Rubber Quiet

NEW YORK, Nov. 25—Crude rubber trading last week was comparatively quiet and prices remained fairly steady, according to the F. R. Henderson Corp. The trade both here and in London paid little attention to the activities of the Rubber Growers Association, which declared during the week that a scheme for cooperative solution would be unpracticable because only one-third of the area planted with rubber is under British ownership and one-tenth under Dutch.

The committee of the Growers Association, which has been considering the question, recommended that smaller groups of plantation companies in and out of the association combine with larger groups, or with each other, each group pooling sales for the benefit of the component companies.

German Experiments Prove Superiority of Radial Engine, Up to 600 hp., Says Report

WASHINGTON, Nov. 25—Experiments conducted in Germany have proved that the radial air-cooled airplane engine has the advantage over the water-cooled engine up to 600 hp., according to a statement Nov. 19 by the National Advisory Committee for aeronautics. In Germany and elsewhere well-known firms which had formerly made vertical water-cooled engines exclusively have turned their attention to the manufacture of radial air-cooled engines, it was stated.

Aircraft engines with lower speed and larger displacement are indicated for commercial use in the future, according to the statement. A long stroke is better for an aircraft engine for the further reason that it enables a lower revolution speed for the same piston speed, it was brought out. The statement follows in full text:

For more than a decade the vertical water-cooled engine was the German standard aircraft engine. It did not seem possible for its fuel consumption, power output per unit volume, length of life and reliability to be surpassed or even equaled by an air-cooled engine. In the last few years, however, there has been active competition between air-cooled and water-cooled engines, and it now can be confidently asserted that, up to 600 hp., the advantage lies with the radial air-cooled engine.

This is indicated by the fact that nowadays hardly any engine within this range is designed for water cooling, while a new radial air-cooled engine appears almost every month. In Germany and elsewhere well-known firms which had formerly made vertical water-cooled engines exclusively have turned their attention to the manufacture of radial air-cooled engines.

In their constant endeavor to obtain higher engine speeds, aircraft engine designers are apparently still under the influence of automobile engine designers. The high speeds may be justified for small water-cooled automobile engines, but they necessitate reduction gears on aircraft engines.

A low-speed, long-stroke aircraft engine, on the contrary, can dispense with reducing gears, thus enabling a greater output with a more economical fuel consumption. Its design is simpler, its production more reliable. Its small fuel consumption enables it to run several hours longer than a high-speed engine with the same weight of fuel.

Financed Plane Sales Expected to Increase

WASHINGTON, Nov. 25 — Recent instability in the aviation industry brought about by reorganization and stock market declines is expected to result in a greatly increased use of instalment selling to expand the market for airplanes, according to information made available at the Department of Commerce on Nov. 23.

Several finance companies have been formed to finance the sale of airplanes on the instalment basis, and a few manufacturers have instituted this plan already, it was learned. A number of automobile companies also have gone into the field, and among these is one of the largest manufacturers, it was brought out.

A new airplane license system has been initiated by the Department of Commerce providing for the issuance of licenses to aircraft which are subject to lien or chattel mortgages brought about through instalment selling, according to the annual report of the Assistant Secretary of Commerce for Aeronautics, Clarence M. Young.

This is a matter of immediate concern to aircraft manufacturers, operators and finance companies, the report states, since it will probably be necessary to finance the marketing of aircraft in the near future. Since a number of aircraft manufacturers are already selling their product on time payments, the inauguration of this system was a necessity, according to the department's statement.

Lacquer Companies Merge

KANSAS CITY, Nov. 25—The Mid-Continent Lacquer Mfg. Co. last week acquired the equipment and business of the Western Lacquer Mfg. Co. The facilities of the two companies will be merged, it was said. H. D. Pinkerton, operator of the Western Lacquer Co., joined the staff of the Mid-Continent company. Business of the latter has nearly doubled during the last year, according to the announcement made by the Mid-Continent Co.

Air-Propelled Launch Tested

BREMEN, Nov. 21—A new type of air-propelled speed boat, which is chiefly intended for service on the rivers of Central America, has been successfully tested on the Weser River. The boat, which measures 40 ft. in length and is fitted with a Liberty motor of 400 hp., developed a speed of 40 m.p.h. and despite its high speed was able to approach the shore to within 20 ft., owing to its unusually small draught of six inches.

Youngstown District Output Low

YOUNGSTOWN, Nov. 25 — Operations of iron and steel companies in the Mahoning and Shenango Valleys has receded to 60 per cent of normal. Some improved buying by Chevrolet has offset a decline of Ford in new steel purchases. Of the 51 independent open hearth furnaces in this district, about half are active, but rolling mills are on a somewhat broader schedule due to automotive demand.

Chrysler Reviews Progress of Corporation in Report

DETROIT, Nov. 25—A special report of the Chrysler Corp., covering the six years since the first Chrysler-built car appeared has been mailed to stockholders, dealers and employees. The report points out that by the end of this year sales will reach 1,400,000 cars, valued at approximately $1,200,000,000.

Walter P. Chrysler, president and chairman of the board, said in a letter accompanying the report:

"Motor car production has been with normal variations, consistently upward for the last thirty years. Adjustment of automobile production to temporary economic conditions from time to time simply accords with good industrial practice. The industry's long term outlook is healthier for these adjustments."

Du Pont to Spend $25,000,000

WILMINGTON, DEL., Nov. 25—Expressing confidence in the soundness of industrial conditions, E. I. du Pont de Nemours & Co. announced yesterday that it would spend more than $25,000,000 on building projects within the next twelve months. Company officials stated that manufacturing activities showed evidences of exceptional expansion.

Finland's Bus Routes Longer Than Rail

WASHINGTON, Nov. 25—Motor bus routes in Finland total 40,000 kilometers, or seven times the distance traversed by state railways, according to a report from foreign representatives made public Nov. 23 by the Department of Commerce. The department's statement follows: About 1500 buses are now in operation, and it is reported that an additional 500 buses shortly will be in use. Cooperation with the state railways went into effect this year and some 30 bus lines already maintain regular schedules supplementing the state railways.

Giant Planes Will Carry 206 Persons

NEW YORK, Nov. 25—Plans for the construction of four monoplanes, so big that 5th avenue traffic could pass between their "landing legs," were announced today by the General Development Co. of Connecticut. These titans of the air, the largest in the world, with a wing spread of 262 feet and a gross weight of seventy-two and one-half tons, will be capable of carrying 206 passengers. They are scheduled to be completed late next year at an estimated cost of $2,000,000. Reid, King and Co., bankers and brokers, of Hartford, Conn., are financial sponsors of the enterprise.

Maine Clarifies Car Model Riddle

AUGUSTA, ME., Nov. 25—The date of announcement of a new car model shall be the basis of determining the year of its origin, according to an opinion written by the attorney-general of Maine for the state board of assessors. Motor vehicles in Maine are taxed on a sliding scale according to the year of the model, and beginning with 23 mills on the dollar for the first or current year of their life.

Completing Vehicle Tunnel

DETROIT, Nov. 25—The last of nine steel tubes forming the river section of the international vehicle tunnel connecting Detroit and Windsor is being fitted into place, according to an announcement made here today.

Senate Bill Provides for Civil Aviation Aid

WASHINGTON, Nov. 25—Appropriation of $40,000,000 for the purchase of aircraft to be furnished to civilian flying clubs for instruction in flying is provided in a bill (S. 2214) introduced in the Senate Nov. 21 by Senator Schall (Rep.), of Minnesota. The bill is introduced as an amendment to the air commerce act of 1926 and authorizes purchases of aircraft by the Secretary of Commerce.

Under the bill civilian flying clubs, formed under direction of the Secretary of Commerce, would be furnished "one or more aircraft fully equipped for use by the club in furnishing flying training to members." Provision is made that $8,000,000 be available each fiscal year, beginning next June, for five years.

To Move a Dodge Plant

DETROIT, Nov. 25—The Canadian plant for the manufacture of Dodge cars is to be transferred from Toronto to Windsor, Ont., during the first week in December, according to an announcement by John D. Mansfield, president of the Chrysler Corp. of Canada, Ltd. The transfer will be a further step in the centralization of Chrysler Canadian interests in Windsor, a move which was begun more than a year ago.

Walker Acquires Swope

DETROIT, Nov. 26—The Walker Machine Co. of this city, maker of screw machine products, has acquired the Swope McCracken Co. and has formed the Walker Machine & Screw Co. Frank Kanter, formerly president of the Walker Machine Co., has become president of the Walker Machine and Screw Co.

Calendar of Coming Events

SHOWS

New York Automobile Salon .....Dec. 1-7
National Power Show, Grand Central Palace, New York .....Dec. 2-7
Baltimore, Aircraft .....Dec. 9-14
East Orange, N. J., Automobile ...Jan. 8-11
Philadelphia, Automobile .....Jan. 11-18
Buffalo, Automobile .....Jan. 11-18
Milwaukee Automobile Show ....Jan. 11-18
Toronto, Automobile .....Jan. 11-18
Cincinnati, Automobile .....Jan. 12-18
Boston, Automobile .....Jan. 18-25
Detroit, Automobile .....Jan. 18-25
Baltimore, Automobile .....Jan. 18-25
Harrisburg, Automobile .....Jan. 18-25
Louisville, Automobile .....Jan. 18-25
Hartford, Automobile .....Jan. 18-25
Pittsburgh, Pa., Automobile .....Jan. 18-25
Brooklyn, Automobile .....Jan. 18-25
Montreal, Automobile .....Jan. 18-25
Louisville, Automobile .....Jan. 18-25
Los Angeles, Automobile .....Jan. 18-26
Copenhagen Trucks, etc. ....Jan. 25-Feb. 2
Rochester, Automobile .....Jan. 20-25
Columbus, Automobile .....Jan. 26-Feb. 1
Portland, Me., Automobile...Jan. 27-Feb. 1
Wilkes-Barre, Automobile ...Jan. 27-Feb. 1
San Francisco, Cal., Automobile...Feb. 1-8
Toledo, Ohio, Automobile .....Feb. 3-8
Wichita, Automobile .....Feb. 3-8
Cumberland, Automobile .....Feb. 3-8
Syracuse, Automobile .....Feb. 3-8
Ottawa, Automobile .....Feb. 3-8
Peoria, Automobile .....Feb. 4-8
St. Louis, Automobile .....Feb. 4-9
New York, American Legion, Aviation .....Feb. 9-15
Denver, Automobile .....Feb. 10-15
Indianapolis, Automobile .....Feb. 10-15
Sheboygan, Automobile .....Feb. 10-16
Mankato, Automobile .....Feb. 12-15
Providence, Automobile .....Feb. 14-22
Copenhagen, Automobile .....Feb. 21
Camden, N. J., Automobile..Feb. 24-Mar. 1
Des Moines, Automobile ....Feb. 24-Mar. 1
Seattle, Wash., Automobile..Feb. 25-Mar. 2
Detroit (All-American Aircraft)..April 5-13
Paris, Trucks .....Nov. 14-24
London, Motorcycles .....Nov. 30-Dec. 7
Brussels Auto Salon .....Dec. 7
New York National.....Jan. 4-11
Newark (N. J.) Automobile Show.Jan. 11-18
Boston Automobile Show.....Jan. 13-25
Chicago National Coliseum..Jan. 25-Feb. 1
Cleveland Automobile Show..Jan. 25-Feb. 1

CONVENTIONS

American Petroleum Institute, Chicago, Dec. 2-5
Asbestos Brake Lining Assn., New York .....Dec. 11
Steel Founders Society Meeting, Pittsburgh .....Dec. 12
American Road Bldrs. Assn., Atlantic City .....Jan. 11-18
Ohio Assn. of Commercial Haulers, Cleveland .....Jan. 30-31
American Society Mechanical Engineers, New York .....Dec. 2-6
Highway Research Board, Ninth Annual Meeting, Washington, D. C. Dec. 12-13
National Automobile Dealers Association, New York City .....Jan. 6
American Roadbuilders Association, Atlantic City .....Jan. 11-18
American Institute Electrical Engineers, New York .....Jan. 27-31
National Automotive Dealers Association, Chicago .....Jan. 27-28
Southwest Road Show and School, Wichita .....Feb. 25-28
American Society Mechanical Engineers, Fiftieth Anniversary Celebration:
New York .....April 5
Hoboken, N. J. .....April 7
Washington, D. C. .....April 8-9

S. A. E.

Annual Meeting, Detroit.....Jan. 21-24

SALONS

Hotel Commodore, New York City..Dec. 1-7
Hotel Biltmore, Los Angeles.....Feb. 8-15
Palace Hotel, San Francisco, Feb. 22-Mar 1